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MONTHLY REPORT

OF THE

DEPARTMENT OF AGRICULTURE

FOR

NOVEMBER AND DECEMBER, 1873.



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# MONTHLY REPORT.

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DEPARTMENT OF AGRICULTURE,  
*Statistical Division, November 25, 1873.*

SIR: I herewith communicate for publication a digest of the November returns, showing the comparative production of corn, cotton, hay, potatoes, and other crops, with extracts from regular correspondence, tables of current prices of certain farm products, statistics illustrating the condition of agriculture in several European countries, and matter pertaining to the operations of the several divisions of the Department.

J. R. DODGE,  
*Statistician.*

HON. FREDERICK WATTS,  
*Commissioner.*

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## DIGEST OF CROP RETURNS.

### CORN.

The November returns do not materially change the corn prospect as indicated in October. This crop is so generally grown, its importance so great in the farm economy, that the reports are not only numerous, but more accurate than local estimates of the minor crops can be, and may be relied on as approximating closely the actual fact—possibly not so closely as census returns, perhaps in some cases a greater approach to accuracy. The so-called failure in 1869 was indicated before the crop was ripe. Instead of eleven hundred millions of bushels, or even ten hundred, the estimates footed up but eight hundred and seventy-four; and a large amount of soft corn was subsequently fed as forage, and not counted as corn gathered in the census. The gathered corn reported in the census was seven hundred and sixty millions of bushels, an aggregate actually less by seventy-eight millions than the crop of 1859, reported ten years previously. The *estimate* was not a bushel higher than the actual amount of corn in the fields at the time, including the soft corn, not of equal value, but utilized for feeding purposes. There was a good corn-crop in 1870, and the estimate was two hundred and twenty millions higher than that of 1869. The present returns indicate another “failure” in the exaggerated language of crop conversation and random crop reporting—a reduction of two hundred and thirty-three millions from that of last year. The per centage of the previous crop is 78. Only six States appear to have as much corn as in 1860, viz, Virginia, West Virginia, Georgia, Florida, Oregon, and Rhode

Island. The reduction in the principal corn-growing States is made as follows: Kentucky, 4 per cent.; Ohio, 11; Michigan, 17; Indiana, 22; Illinois, 29; Wisconsin, 13; Minnesota, 10; Iowa, 28; Missouri, 32; Kansas, 31; Nebraska, 40. Last year's estimate for Illinois was two hundred and seventeen millions; the present, one hundred and thirty-two millions—a difference of eighty-five millions. The percentages in the following principal counties, each of which produces from one to five millions in an average season, are: Montgomery, 33; Mason, 40; Adams, Bureau, De Witt, Moultrie, Piatt, Stevenson, Vermillion, 50; Mercer, 55; Cass, Lee, Marshall, Whitesides, Winnebago, 60; Hancock, Knox, Tazewell, 65; Ogle, 66; Edgar, Pike, Warren, 70; Sangamon, 72; Car Douglas, roll, McHenry, Marion, Wayne, 75; Henry, Macon, 80; Starke, Saint Clair, 90; Madison, 100.

The reduction is heavy also in Iowa; the following counties, which count by millions of bushels, returning percentages as follows: Fremont, Marion, 50; Benton, Jefferson, Mills, 60; Tama, 65; Madison, 70; Clinton, Jones, Mehaska, 75; Iowa, Lee, 80; Jackson, 85; Linn, 90.

The percentage for New York is 92; for Pennsylvania, 84; Tennessee, 91; Mississippi, 85; Arkansas, 90; Texas, 75. Nebraska gives the lowest percentage; Florida the highest. A classification of the counties show that, of 983 represented, 652 return smaller products than those of 1872; 185 larger, and 146 the same as last year, as follows:

States.	Number of counties reporting above average.	Number of counties reporting average.	Number of counties reporting below average.	Total number of counties reporting.
Maine.....			9	9
New Hampshire.....		5	3	8
Vermont.....	1	3	7	11
Massachusetts.....	1	3	3	7
Rhode Island.....	1	2		3
Connecticut.....		1	4	5
New York.....	8	6	27	41
New Jersey.....	4	1	8	13
Pennsylvania.....	3	6	29	38
Delaware.....			1	1
Maryland.....	4		6	10
Virginia.....	27	8	19	54
North Carolina.....	12	9	30	51
South Carolina.....	2		13	15
Georgia.....	16	14	17	47
Florida.....	11	3		14
Alabama.....	12	5	10	27
Mississippi.....	3	6	12	21
Louisiana.....	7	3	8	18
Texas.....	5	6	38	49
Arkansas.....	8	3	15	26
Tennessee.....	8	8	37	53
West Virginia.....	11	9	8	28
Kentucky.....	10	6	25	41
Ohio.....	5	5	37	47
Michigan.....	3	4	24	31
Indiana.....	6	3	29	38
Illinois.....	1	3	51	55
Wisconsin.....	2	2	19	23
Minnesota.....	3	5	12	20
Iowa.....	1	1	49	51
Missouri.....	2	3	58	63
Kansas.....	1	3	22	26
Nebraska.....	1	2	13	16
California.....	1	7	7	15
Oregon.....	5	1	2	8
Total.....	185	146	652	983

The quality of corn is reported poorer than last year in nearly all the States, the only exceptions being Massachusetts, Virginia, Florida,



Alabama, and California. The Western States give the lowest figures: Iowa, 83, (a depreciation on the whole crop of last year of one-sixth;) Illinois, 85; Indiana, 83; Ohio, 85; Missouri, 79; Kansas, 79; Nebraska, 76. Other States do not exhibit a depreciation of more than ten per cent., except Pennsylvania, which is reported at 86. The prevailing characteristics of the season have been a wet spring, a summer too dry and short, early frosts, in many places cool rains in early autumn. The early-planted corn ripened well; much of the late-planted was immature when frost came, some of it so soft as to be of little value after thorough freezing. That portion of the early-planted which was deficient in drainage, either natural or artificial, was either "drowned out" or injured in its vitality and subsequent growth.

The winter set in too early for the in-gathering, one county in Wisconsin having twelve inches of snow when only a third of the crop had been harvested. The losses always apparent through insufficient or inefficient culture are doubly manifest in a season like this. Indications of this fact are everywhere observable in such remarks as these: "Intelligent cultivation has produced good crops;" "Crops shortened one-fourth by bad culture;" "Corn culture is declining through a lack of rotation."

The following extracts should not be deemed the substance of our own reports, as it would be a monotonous and interminable task to write or read all the volunteer remarks appended to the systematic returns intended for tabulation. They are only specimens selected with reference to peculiarities of local reports:

MAINE.—*Waldo*: Corn was badly injured by drought and the corn-worm. *Oxford*: Injured by frost; quality poor. Sweet-corn is becoming quite a farm product. A large canning establishment absorbs the product of an area fifteen miles square. Another establishment is in operation just across the line of Cumberland County. *Piscataquis*: Shortened by cold season and killed by frost before ripening. *Androscoggin*: Cold, late planting-season prevented its filling, but what did fill ripened well in October. *Sagadahoc*: Cold, wet spring rendered the crop very inferior. *Cumberland*: Shortened one-tenth by cold, wet spring and dry summer. Half the crop is sweet-corn, of which there were manufactured 3,000,000 cans, netting the farmers \$135,000.

NEW HAMPSHIRE.—*Hillsborough*: About average. *Carroll*: Fodder plenty.

VERMONT.—*Lamoille*: Retarded by cold August and damaged by frost in September. *Rutland*: Injured by June drought. *Essex*: Slightly frosted; one-tenth spoiled. *Franklin*: Good, though late; not frosted. *Orleans*: Injured by frost early in September; large proportion of soft corn.

MASSACHUSETTS.—*Berkshire*: Corn mostly confined to the valley towns; crop average; sweet-corn culture enlarging. *Norfolk*: Yield reduced by drought in spring and early summer; quality good.

NEW YORK.—*Yates*: Short crop; unfavorable planting season. *Seneca*: About average. *Oneida*: Uneven; suffered from June drought. *Warren*: Frost too early for corn, much of which had been replanted. *Chemung*: Some pieces good, but the general average is low. *Washington*: Late, and injured by frost. *Erie*: Early plantings injured by cut-worms; some fields destroyed. Adam's Early, from the Department, was not so early as the common eight-rowed corn. *Rockland*: Very uneven; dry planting season. *Genesee*: Very uneven; some fine pieces and many poor ones; very fine where early planted in good soil and uninjured by worms. *Ontario*: Came up unevenly; yield inferior; first frost October 25. *Wyoming*: The corn season lengthened greatly, benefiting the crop. Early Huntington has ripened well, making good soft meal for cooking, but its ears are short and its yield is less than our common corn. *Columbia*: Good, and well harvested. *Otsego*: Shortened by cool summer and early frost. *Allegany*: Did not germinate well after replanting. *Sullivan*: Injured by frost.

NEW JERSEY.—*Atlantic*: Unusually good; abundant rains since August. *Sussex*: Not so good as last year; the ear-ends are bare of grain to a greater extent than usual. *Gloucester*: Late ripened but no injury from frost; first killing frost October 25. *Mercer*: Late planted and injured by June drought and September storm, but not by frost. *Burlington*: Good ripening season. *Warren*: Shorter than was anticipated. *Union*: Sound and ready for market. *Hudson*: Yield better than was anticipated; ripened before frost. *Hunterdon*: First killing frost October 25, the latest ever known here.

PENNSYLVANIA.—*Franklin*: Corn matured better than was expected; no serious

frost till October 29. *Centre*: Crop light; much did not mature. *Erie*: Late and much injured by September frosts. *Clinton*: Corn from first planting superior. *Northumberland*: Average yield and quality. *Wyoming*: Poorest crop in fifteen years badly frosted. *Northampton*: Early plantings 20 per cent. above last year; late plantings 20 per cent. below; average about the same as last year. *Elk*: Much unsound corn on account of replanting. *Beaver*: Husking delayed by stormy weather; much soft corn. *Lawrence*: Early frosts made much soft corn. *Fayette*: Crop short; cut-worms and poor seed. *Armstrong*: Softened by early frosts. *Lehigh*: Yellow corn ripened tolerably; gourd-seed not so well; much of it soft. *Jefferson*: Very good in quantity and quality; not injured by frost. *Lycoming*: Acreage about the same as last year but yield less. *Bucks*: Light crop. *Lancaster*: Reduced 20 per cent. below average by poor planting season. My lot of 20 acres produced 1,500 bushels. *Westmoreland*: Injured by early frosts.

**DELAWARE.**—*Kent*: Late plantings did well; early plantings injured by drought.

**MARYLAND.**—*Howard*: Late favorable weather has partially repaired the damages of cut-worms, late planting, and drought. *Dorchester*: Shortened by drought but of good quality. *Carroll*: Good except when worms destroyed the plantings. Some crops yield 90 to 100 bushels per acre. *Queen Anne's*: Crop lighter than was supposed. *Baltimore*: Crop fair. *Washington*: Largest crop ever made, in spite of drawbacks.

**VIRGINIA.**—*King and Queen*: Improved by late summer rains. *Prince William*: Cut-worms and weather made a late stand, but frost did not reach it. *Madison*: Yield above average; quality prime. *Rappahannock*: Not so good as last reported; not well filled, owing to excessive rains and cloudy weather. *Northampton*: Better than was expected. *Rockingham*: A fine season has repaired the damage of the cut-worm. *Spotsylvania*: Quality superior; yield 20 per cent. above last year's; Pennsylvania Yellow a success. *Fluvanna*: Full crop and in good order. *Pittsylvania*: Never recovered from the July drought. *Pulaski*: Matured well. *Loudoun*: Although the season was favorable the crop did not harvest so well as was expected; probably below average, though 10 per cent. above last year's. *Middlesex*: Best crop for four years. *Louisa*: Average. *Fauquier*: Fine season; even late plantings ripened. *Rockbridge*: Heavy crop. *James City*: This year has shown the value of early plantings. *Chesterfield*: Large acreage and yield, but not of good quality; frosted. *Bland*: Injured by grub-worms. *Henrico*: Below average, but 50 per cent. above last year's; affected by July drought. *Mecklenburgh*: Shortened by rains in planting-time, by floods on flat lands; later plantings injured by drought and chinch-bug. *Orange*: Season too dry for corn. *Northumberland*: Corn injured by drought and hail-stones. *Sussex*: Acreage increased 20 per cent., and quality as good as last year. *Page*: Full average and good quality. *Goochland*: Better than for years, though bottom plantings were injured by freshets; the increased upland yield will make the entire crop 20 per cent. greater than last year. *Cumberland*: Very fine. *King George*: Good crop; better than last year. *Highland*: Injured by worms; skunks destroy these worms. *Floyd*: Injured by drought and worms. *Clarke*: Yield double last year's; sufficient rain, but not quite enough heat; crop average. *Bath*: Light. *Dimwiddie*: Fine season and increased yield.

**NORTH CAROLINA.**—*Stokes*: Stand late and poor; did not escape frost; yield 70 per cent. of last year, and not of so good quality. *Rutherford*: Injured by excessive rain. *Stanly*: More abundant than last year, but no better; injured by excessive rains and floods; much rotten corn. *Person*: Greatly shortened by drought. *Chowan*: Crop short. *Craven*: Average increase 10 per cent.; yield per acre equal to last year's, and quality better. *McDowell*: Shortened by late planting and wet season. *Tyrrel*: Average. *Beaufort*: Injured by rains. *Lenoir*: Fair. *Gaston*: Good, but not equal to expectations. *Forsyth*: Fine; 50 cents per bushel. *Franklin*: Average where well cultivated. *Yadkin*: Short. *Davidson*: Abundant through late rains. *Greene*: Short 25 per cent. *Granville*: Damaged by June drought and July rains. *Haywood*: Yield equal to last year's; injured by rain and loose on the cob. *Rowan*: Not so heavy as last year. *Currituck*: Shortened by wet and increased cotton-culture. *Martin*: Above average and of good quality. *Perquimans*: Poor.

**SOUTH CAROLINA.**—*Williamsburgh*: A little below last year; too wet for cultivation. *Lexington*: Below last year in quantity and quality. *Georgetown*: Damaged by September rains, much of it rotting in the field. *Marlborough*: A considerable acreage was abandoned to grass on account of deficiency of labor. *Fairfield*: Bottom crops almost failures; upland better, but the aggregate yield is poor. *Newberry*: Bottom crops light and inferior. *Richland*: Shortened by wet; neglected for cotton. *Laurens*: Better and sounder than for ten years.

**GEORGIA.**—*Jackson*: Bottom crops injured by wet; upland crops fine where well cultivated. *Macon*: Gathers better than was expected. *Hart*: Good; equal to last year's. *Upson*: Twenty-five per cent. better than last year. *Towns*: Shortened by drought at silking. *Gwinnett*: Ten per cent. less than last year; quality as good. *Muscogee*: Below last year both in quantity and quality. *Oglethorpe*: Has not recovered from neglect in June. *Whitfield*: Full average, but remarkably small. *John-*



*son*: Damaged by excessive wet. *Dawson*: Bottom crops injured by rain; upland crops, well worked, are very fine. *Liberty*: Injured by rain.

FLORIDA.—*Hillsborough*: Crop housed in good order. *Taylor*: Better than ever known; Cooley corn from the Department a success. *Leon*: Crop large, but affected with rot. *Gadsden*: Full average and ten per cent. above last year. *Madison*: Greater quantity but lighter weight than last year. *Jackson*: Average quantity and nearly average in quality.

ALABAMA.—*Bullock*: Reduced ten per cent. below last year by wet spring, but the quality is better. *Leviston*: Sixty per cent. of last year's crop. *Lawrence*: Varies from average to fifty per cent. below. *Crenshaw*: Equal to last year. *Clinch*: Better than last year, but below average. *Worth*: Good. *Blount*: Full average. *Pike*: Less than was expected; unusual proportion of rotten corn. *Saint Clair*: Sells at fifty cents per bushel. *Calhoun*: Fine in quantity and quality. *Clarke*: Better than last year. *Dallas*: Half crop; excessive rains prevented cultivation.

MISSISSIPPI.—*Lee*: Light but fine. *Jefferson*: Quality as good as last year, but yield less. *Hancock*: Did well. *Kemper*: Short. *Jones*: Better than was anticipated. *Jasper*: Injured by rain and grass. *Grenada*: Injured by spring rains, summer drought, and poor culture. *Winslow*: Pennsylvania Yellow successful; four weeks earlier than the ordinary varieties. *Wilkinson*: Rot and weevil injured the crops. *Tishomingo*: Sound. *Louendes*: Short. *Rankin*: Much corn rotted on the stalk.

LOUISIANA.—*East Baton Rouge*: Almost a failure. *La Fourche*: Very short. *Iberia*: Corn \$1 to \$1.50 per barrel. *Rapides*: Very short; much rotten. *Franklin*: Considerable rot. *St. Mary*: A fourth of a crop and poor. *Assumption*: Failed through excessive rains.

TEXAS.—*Hamilton*: Turned out tolerably in spite of spring frosts and grasshoppers. *Bandera*: First two plantings destroyed by frost; the third injured by rain and worms; heavy frost October 20. *San Saba*: Inferior; late planted injured by insects and rotted. *Rusk*: Average. *Ellis*: The increased acreage will about counterbalance the decreased yield. *Cooke*: Very indifferent. *De Witt*: Damaged by wet; below average. *Harris*: Excessive growth of stalk and imperfect growth of ears; the increased acreage will bring up the yield to last year's. *Wood*: Injured by rot. *Coryell*: Not over 15 bushels per acre; less than last year. *Red River*: Smaller crop than was expected. *Collin*: Shortened by drought succeeding the heavy rains of May and June. *Milam*: Enough corn for home consumption. *Dallas*: Reduced by rains to three-fourths average. *Parker*: Shortened by grasshoppers in the spring, and by droughts afterward. *Upshur*: One-fourth short of last year; much rotten corn. *Kendall*: Poor. *McLennan*: Injured by May drought. *Burnett*: Poor yield; season unfavorable; hardly a fourth of the crop sound. *Kaufman*: Ten per cent. below last year; unfavorable season. *Cherokee*: Perhaps there will be a small surplus. *Lamar*: Wet spring caused the loss of a considerable acreage planted in corn; average yield decreased, but the total product equal to last year's. *Medina*: Product per acre and quality below last year. *Austin*: Light, and not equal to the home demand. Intelligent cultivation has produced good crops; prices 20 per cent. above last year's.

ARKANSAS.—*Fulton*: People scared at their short crops, but with careful feeding there is enough for home demand. *Franklin*: Short. *Perry*: Crop light, but supplemented by a heavy mast. *Boone*: Badly worm-eaten. *Baxter*: Shortened by drought. *Bradley*: Stands late and yield poor. *Arkansas*: Crop good and well secured. *Cross*: Below average, but better than last year. *Garland*: Planted largely, but shortened by drought. *Crittenden*: Short acreage and product. *Madison*: Rotted by August rains.

TENNESSEE.—*Dickson*: Gathers better than was expected; quality good. *Fentress*: Equal to last year in yield and quality; where well cultivated the crop was above average. *Hickman*: Early corn good; later, shortened by drought. *Haywood*: Shortened one-fourth by bad cultivation. *Shelby*: Considerable rot. *Hancock*: Gray squirrels destroyed 10,000 bushels. *Obion*: Damaged by wet spring. *Wilson*: Damaged by drought. *Weakley*: Lightest crop ever grown here. *Dyer*: One-fourth short, but sound and well matured. *Grundy*: Corn-culture surely declining through lack of rotation. *Wilkinson*: Superior to last year. *Blount*: Good, though injured by the late drought. *Sumner*: Shortened by drought following excessive rains. *De Kalb*: Late corn damaged 10 per cent. by frost. *Lawrence*: About three-fourths of a crop; injured by drought. *Smith*: Not so good as was expected; early growing season unfavorable. *Truesdale*: Short of last year 25 per cent. *Putnam*: Average; quality below. *Carter*: Injured by June rains and subsequent drought; but still average, and of excellent quality. *Bradley*: Badly damaged by drought and grasshoppers. *Canon*: Shortened by spring rains and summer drought. *Jackson*: Injured by summer rains. *Monroe*: Equal to last year. *Robertson*: Acreage the same as last year; stand irregular; cut-worms unusually troublesome; excessive rains; poor cultivation. *Montgomery*: Much rotten corn.

WEST VIRGINIA.—*Raleigh*: Excellent. *Grant*: Vast quantities of corn frosted; in *Milbury* district three-fourths of the fodder is ruined. *Jackson*: Average; the acreage

has not increased enough to bring up the aggregate product to last year's extraordinary yield. *Mercer*: Half of last year's aggregate product and not nearly so well matured. *Pleasant*: A good crop in spite of late plantings, excessive rain, and poor culture. *Marion*: Smaller than last year by 10 per cent.; quality poorer. *Mineral*: Unusual amount of soft corn; heavy freeze October 30. *Brooke*: Much replanted and consequently did not escape frost. *Jefferson*: Well matured and but little frosted. *Braxton*: Yield a little less than last year and not quite so good. *Morgan*: A very remarkable crop considering the drawbacks of the early season. *Harrison*: Good and in good condition. *Tyler*: Quality very good.

KENTUCKY.—*Hardin*: Less than was supposed. *Oldham*: Average and of good quality. *Jefferson*: Over average and well matured. *Laurel*: Wet June prevented plowing and the grass and weeds took the fields. *Nicholas*: Early crop injured by drought; late crop better than last year. *Lincoln*: Well matured and sound. *Spencer*: Greatly impaired by drought; frost with ice October 28. *Taylor*: Wet, early season prevented working the crop; drought then occurred and lasted till October, greatly reducing the yield. *Clinton*: Acreage and yield decreased. *McLean*: Drowned out in the bottoms, many fields being abandoned; on rolling land the season did not admit of good cultivation. *Graves*: Below average 5 per cent; May and June wet, followed by drought in July and August. *Logan*: Barely enough for home consumption. *Ohio*: Short and bad; freeze October 28. *Fayette*: Superior; none frosted; dry and sound. *Anderson*: Above average; good growing and gathering season. *Johnson*: Injured by drought. *Owsley*: Injured by wet and storms; much rotten corn. *Livingston*: Injured by spring floods and summer drought. *Jackson*: One-fourth below average; quality equal to last year's.

OHIO.—*Vinton*: Injured by rain and floods. *Fulton*: Late planting and dry summer; short crop. *Jackson*: Best crop for many years; quality good. *Medina*: Crop diminished by late planting, imperfect tillage, grasshoppers, and early frosts. *Coshocton*: Inferior; ripened prematurely and was frosted; poor harvest season. *Lorain*: Shortened by replanting, grasshoppers, and frost, September 20. *Crawford*: Frosted in September. *Delaware*: Very disappointing. *Geauga*: Injured by replanting, poor seed, grasshoppers, and September frosts. *Henry*: Unfavorable growing season and early frosts. *Wyandot*: Replanting and early frosts; much soft corn. *Laurence*: Best crop for several years. *Hamilton*: Good on clay lands but poor on sandy soils. *Mercer*: Very light, and much not well matured. *Perry*: Increased acreage; crop far above average on high lands; injured by early frosts on some low lands, which reduces the average quality.

MICHIGAN.—*Shiawassee*: Mostly matured, but the fodder was badly injured by frosts. *Mason*: Shortened by summer drought. *Lapeer*: Generally good and well matured, though some fields had been replanted. *Calhoun*: Much damage from defective seed; decreased area. *Gratiot*: Had to be replanted, in some cases three times, which reduced the yield seriously. *Jackson*: Cold weather interferes with gathering corn. *Ottawa*: Too dry to fill well. *Oakland*: Fair; stalks excellent. *Oceana*: Greatly shortened by drought. *Antrim*: Injured by August drought. *Berrien*: Shortened by excessive drought, but of good quality. *Livingston*: Worst season and poorest crop ever known here; late planting, poor seed, and cut-worms.

INDIANA.—*Owen*: Half average; excessive rain, then drought, and then frost. *Marion*: Yield greatly shortened by late spring, decreased acreage, heavy rains, floods, &c. *Grant*: Half crop. *Noble*: Considerable soft corn. *Hendricks*: Very little damage from frost. *White*: Shortened by summer drought and September frost. *Miami*: Considerable soft corn; late cold spring and early fall frosts. *Montgomery*: Acreage reduced; plantings late, and some crops caught by frosts; much soft corn. *Ripley*: Good in some places; in others injured by late cold spring and by early fall frosts. *Gibson*: Early corn good; late plantings shortened by drought, chinch-bug, and frost. *Hamilton*: Not gathered, and will be injured by the prevailing weather. We like our own corn better than the Pennsylvania yellow. *Martin*: Shortened and depreciated in quality by the August drought. *Steuben*: Most of the corn unhusked. *Cass*: Shortened by late planting, drought, and early frosts. *Morgan*: Short and inferior. *Wells*: Unsound. *Brown*: Early plantings good and sound; late plantings caught by frost; light in the cob and chaffy. *Dearborn*: Early plantings good; late variable; some ruined by drought and others by chinch-bugs. *La Porte*: Yield equal to last year in quantity, but rather poorer in quality on account of drought. *Floyd*: Best crop for years; worth 45 cents per bushel in wagons. *Ohio*: Shortened by drought and chinchies.

ILLINOIS.—*Kankakee*: Fair crop on high lands; on flat prairies late plantings were injured by drought and autumnal frosts. *Richland*: Shortened by unfavorable planting season and rainy harvest. *Madison*: Increased acreage will bring the crop up to last year's aggregate; crop late. *Pike*: Shortened by drought and chinchies. *White-side*: Considerable soft corn; stock turned into the fields to eat it. *Tazewell*: September frosts made much short corn. *Macon*: First plantings well matured; late plantings, about two-thirds of the crop, will not do to crib, but are being fed to cattle and



hogs. *Putnam*: Many fields frosted. *Bureau*: Much soft corn. *Perry*: Early plantings did well; late plantings failed through drought. *Sangamon*: Early season wet; early fall frosts; crop a comparative failure. *Montgomery*: Late plantings badly frost-bitten, chaffy and loose on the cob. *Vermillion*: Half crop, and only half of that merchantable. *Winnebago*: Poor planting season and September frosts shortened the crop, yet it is mostly sound. *Cass*: Shortened by wet spring and dry summer. *Edwards*: Very fine. *Grundy*: Late planting reduced acreage and delayed the crop till frost came. *Mason*: Acreage and product greatly shortened. *Piatt*: Half a crop; much of it loose on the cob. *Boone*: Late planted, and hence caught by the frost of September 13. *Clinton*: Good corn season; large acreage; crop injured by chinchies, late planting, and want of tillage. *Lee*: Quantity 40 per cent. and quality 10 per cent. below last year.

WISCONSIN.—*Richland*: Much corn unhusked and winter upon us. *Juneau*: Six inches of snow and much corn ungathered; ice 2 inches thick. *Greene*: Badly frosted. *Adams*: Injured by hot, dry summer. *Calumet*: Ripened well. *Dodge*: Reduced acreage; much replanted; early frosts prevented its ripening well; yield about 75 per cent. of an average. *Fond du Lac*: Shortened by drought while in the ear. *Walworth*: Early plantings average; late plantings injured by drought and frost. *Outagamie*: Two-thirds of the crop ungathered, and 12 inches of snow. *Green Lake*: Crop good and well matured, though injured by August drought.

MINNESOTA.—*Benton*: Secured before frost. *Steele*: Good, but not equal to last year's extra crop; acreage slightly increased. *McLeod*: Crops on low flat lands injured by cold, wet planting season; the season later was fine, and matured the crop well. *Pennsylvania Yellow*, from the Department, made a heavy crop; some stalks 14 feet high. *Carver*: *Pennsylvania Yellow* turned out heavily, but was a little late; probably too deeply planted. *Redwood*: Late spring made a light crop. *Houston*: Not half husked. *Martin*: Put back by wet spring and somewhat injured by grasshoppers; Dent varieties injured by early frosts. White Dent and Cherokee the best; *Pennsylvania Yellow* good. Corn, though much neglected, is one of our best crops, yielding from 60 to 125 bushels. *Isanti*: Ripened well; better quality than last year; *Pennsylvania Yellow* did not ripen well; not suitable to the latitude.

IOWA.—*Pocahontas*: Not so good as was expected. *Ringgold*: Injured by extreme summer drought. *Story*: Shortened by the backward spring and early frost. *Clinton*: Well ripened, but not yielding as well as was expected. *Clarke*: Badly injured by summer drought. *Decatur*: Best crop we ever raised. *Harrison*: Late planted and poorly cultivated; acreage smaller than even in 1872, the people giving special attention to wheat; summer drought and grasshoppers did much damage; quality inferior. *Mills*: Half of last year's crop. *Boone*: Damaged by early rains; deficiency equalized by increased acreage. *Appanoose*: Crop from 15 to 50 bushels per acre; early plantings best; bottom crops poorest; late corn light and chaffy. *Clayton*: Scarcer than for twenty years. *Fayette*: Injured by drought. *Floyd*: Not husking out as well as was expected. *Hardin*: Frost made much soft corn and loose on the cob. *Audubon*: Poorest crop in thirty years. *Tama*: *Pennsylvania Yellow* too late for this climate; yields 50 bushels; was frosted. *Benton*: Late plantings injured 15 per cent. by early frosts; early plantings average. *Plymouth*: Injured by grasshoppers. *Linn*: Well matured, and a fair average crop. *Des Moines*: Severely injured by the unprecedented drought; even wells have gone dry. *Jefferson*: Seriously damaged by drought. *Winnebago*: Good corn scarce; selling at 40 to 50 cents per bushel, against 25 and 30 last year; acreage reduced; poor stand; early and repeated frosts. *Louis*: Equal to last year, where early planted and well cultivated; some sandy soils will not return 5 bushels per acre. With last year's surplus there is an average supply of corn. *Marion*: Crops vary from one-third to two-thirds of last year's. *Guthrie*: *Pennsylvania Yellow* does well. *Calhoun*: Somewhat frosted. *Grundy*: Half crop. *Lee*: *Pennsylvania Yellow* yields 65 bushels per acre, 15 more than any other variety; ripens earlier.

MISSOURI.—*Gasconade*: Injured by chinchies. *Polk*: Greatly injured by drought and chinchies. *Caldwell*: Perhaps average on deep-plowed ground; late shallow plantings of no account except for fodder. *Audrain*: Wet spring reduced the acreage, subsequent drought cut short the yield 60 per cent. of an average and 50 per cent. of last year's crop, making the actual yield but 40 per cent. of an average. *Jasper*: Injured by drought and chinch-bugs. *Miller*: Cut down half by drought and chinchies. *Platte*: Quarter of a crop, and inferior. *Holt*: Reduced by drought. *Clinton*: Very poor, injured by late planting, excessive rains in May, summer drought, and early frosts. *Harrison*: Shortened by drought but sound. *Clay*: Shortened by drought and grasshoppers. *Saint Clair*: Poor; cob soft; poor fodder. *Benton*: Greatly injured by long-continued drought. *Baxter*: Very light; quality inferior. *Douglas*: Light but good; late plantings injured by drought and chinchies. *Potter*: Light and chaffy through drought. *Carter*: Lightest crop since 1854. *Texas*: Yield 20 per cent. below last year; injured by chinchies. *Adair*: Two-thirds of a crop; quality inferior. *Howard*: Shortened by drought. *Montgomery*: Limited by wet spring and subsequent drought. *Perry*: Failure through drought and chinch-bugs. *Phelps*: Injured by

drought and chinch-bugs. *Carroll*: Not feeding well; light and chaffy; requires 50 per cent. more than last year. *Cass*: Injured by drought. *Franklin*: Bottom crops good; upland below average. *Morris*: Damaged by chinch-bugs after severe drought. *Laclede*: About 50 per cent. short. *Dallas*: Cut short by drought and chinch-bugs. *Newton*: Shortened by drought and chinch-bugs. *Cole*: Shortened by drought and chinch-bugs, in some cases one-half. *Pemiscot*: Neglected for cotton. Pennsylvania Yellow from the Department was very early, but the ears were too small for field-corn.

KANSAS.—*Miami*: Drought following spring rains greatly shortened the crop. *Nemaha*: Shortened by drought, but with 30 per cent. of last year's crop on hand there will be a surplus. *Clay*: Much injured by drought; early frosts. *Bourbon*: Less than was expected. *Shawnee*: Early bottom-crops good; late hill-crops a failure. *Jefferson*: Shortened by drought following excessive rains; fodder unusually good and abundant. *Labette*: Increased acreage, but crop shortened by drought and chinch-bugs. *Linn*: Forepart of the season wet, preventing the working of crop; much late planted. *Montgomery*: Badly damaged by chinch-bugs. *Woodson*: Injured by chinch-bugs. *Coffey*: Light but sound; much old corn on hand; price 30 to 35 cents per bushel. *Republic*: Good and sound, with thorough cultivation. *Cowley*: Early plantings sound, firm, and solid; late plantings light and chaffy. *Osage*: Quantity deficient; quality good; nearly all plantings after May 1 are worthless. *Smith*: Damaged by grasshoppers. *Wilson*: Nearly destroyed by chinch-bugs on the uplands. *Riley*: Severely shortened by drought. *Neosho*: Injured by drought and chinch-bugs. *Cherokee*: Acreage decreased 10 per cent.; yield 25 per cent.; quality 15 per cent. below average.

NEBRASKA.—*Johnson*: Half average. *Wayne*: Late through wet spring, and shortened by drought. *Pawnee*: Shortened three-fifths by drought. *Webster*: Injured by rain in planting time. *Antelope*: Harvesting very fair; acreage largely increased, but early frosts reduced the quality 20 per cent. *Nemaha*: Seriously affected by drought in the eastern part of the State, and by grasshoppers in the western part. *Cass*: Much lighter than was expected. *Otoe*: Drought since June; corn greatly reduced in quantity and quality.

CALIFORNIA.—*Alameda*: Ripened finely.

OREGON.—*Curry*: Adams Early corn ripened six weeks before any other; promises to be the most valuable variety on the Pacific coast.

COLORADO.—*El Paso*: Matured well; produced 40 bushels per acre at an elevation of 6,000 feet above sea-level; one field in Pueblo County averaged 78.26 bushels per acre.

UTAH.—*Kane*: Larger crop than last year, but more injured by grub in the ear, especially late crop. *Weber*: Excellent. *San Pete*: Season too cold for ripening; Pennsylvania Yellow frosted in the milk.

DAKOTA.—*Clay*: Very light; grasshoppers.

IDAHO.—*Ada*: Injured by September frosts.

ARIZONA.—*Yavapai*: Increased by late rains.

NEW MEXICO.—*Moro*: Crop backward through drought; some frosted. *Doña Ana*: Shortened by lack of moisture. *Santa Ana*: Much of this crop yet green.

## COTTON.

The following answer to an inquiry frequently made by persons who have not examined carefully the wording of our schedules, may serve to correct any misapprehension that may have arisen from a superficial reading of these reports:

In answer to yours asking "what constitutes an average cotton-crop according to the reports of the Agricultural Bureau," I suppose you refer to the returns by our statistical corps of the condition of the growing crop, for example, "average condition October 1" for each State respectively. It is not an estimate of the quantity of fiber that will be gathered, but it is simply a report of the comparative "condition," the state of development, vitality, and healthfulness of the plant, the standard of comparison being 100, the unit representing a normal or "average" development. It is the universal and only practicable mode of reporting the status of a growing crop not yet fruited, and subject to a thousand vicissitudes. As a farmer remarks of his wheat, that it will be one-third short of a fair crop; of his corn, that it will be 10 per cent. better than usual; as a newspaper reporter says of the hay-crop of a neighborhood, that it will only average three-fourths of a crop, so our correspondents, writing from different points which have soils of differing capacities, report the comparative vigor and development of a crop, with reference to a normal or average condition of health and vigor, which, if continued, would give ultimately an average crop.

In November our returns are not of condition, but a direct estimate of the total quantity produced in each county in comparison with the crop of last year.

The insatiate desire of Americans to discount the future and calculate from the



opening of a flower in June the quantity and value of its fruitage in October, leads to the expectation of many an absurdity; and it is frequently the case that a positive prediction of the aggregate quantity of cotton is deduced from our summer reports of ever-changing condition, and as the changes of the season occur, floods devastate, worms destroy, the Department is held rigidly responsible for absurd deductions from the truthful record of June or July.

The weather has been generally favorable for cotton-picking during the past month, as well as for ripening of the later bolls. Some of the reports are exceptionally favorable. In the more northern portion of the cotton-belt fields that were planted late were caught by the frost, but the area thus injured has nowhere been large. Low temperature in spring caused a slow growth in the uplands of Carolina, and in some instances a failure to mature. Florida has continued to report disastrous storms and destruction by the caterpillar. In some cases, in which the plant had "run to weed," the presence of worms that appeared late has been considered an advantage, arresting growth and tending to more rapid opening of nearly developed bolls. In the Gulf States there were few frosts until November, though one of some severity is reported in Bossier Parish, Louisiana, on the 28th ultimo. A circular has been sent out to ascertain the date of the first killing frost in each county, in connection with the average time of recurrence of such frosts for a series of years, and also the date of commencement of picking, which will be the subject of a later report. The November returns make mention of little yellow or stained cotton, many of them indicating superior quality in the fiber. More complete and systematic information on this point will also be included in the next report. In the entomologist's department of this issue will be found a result of the investigation relative to the best means of destroying cotton-insects.

Good reports of the "Peeler" cotton are made, yields of 1,600 pounds of seed-cotton being frequent.

Unlike the returns of previous months, which relate to comparative condition without reference to area, those of November make a direct comparison of the aggregate amount of cotton grown in each county with that produced in the previous year. Our correspondents have thus estimated the production of a large portion of the cotton area. Not only are these estimates in accordance with the general tenor of previous reports, but they are in essential harmony with those of cotton associations which make systematic statistical collections, except that they are somewhat higher, as usual, but probably not too high, as they have rarely ever exceeded the actual result.

We make the product compared with last year, expressed as a percentage, as follows: North Carolina, 98; South Carolina, 92; Georgia, 97; Florida, 97; Alabama, 91; Mississippi, 85; Louisiana, 80; Texas, 112; Arkansas, 102; Tennessee, 102. In view of the marked increase in area in most of the States, these figures indicate a crop considerably less than an average. A careful recanvassing of the question of area gives 9,509,524 acres in the ten cotton States, against 8,482,905 in 1872, an increase of 1,026,619 acres, or 12 per cent. The increase of area in the several States appears as follows: North Carolina, 14 per cent.; South Carolina, 10; Georgia, 11; Florida, 6; Alabama, 8; Mississippi, 11; Louisiana, 10; Texas, 20; Arkansas, 17; Tennessee, 15. Commercial authorities in cotton matters have been in the habit, for several years, of including two or three hundred thousand acres in more northern States, nine-tenths of which are a myth, based on an attempted planting on a large scale in years of cotton scarcity, an effort which has been discontinued by the planters, as its record has also been in these reports. The census only reported 3,148 bales in Missouri, Ken-

tucky, Virginia, Illinois, Kansas, Nevada, California, and other Northern States. While this is by no means a complete enumeration, the amount is still small notwithstanding a reported increase in Missouri and California.

The following table presents a statement of the census crop of 3,000,000 bales, an estimate by States of the crop of last year, which is shown by the cotton movement to have been about 30 per cent. larger than that of 1869, and the yield indicated by the November returns of the present year, with the estimated area and yield per acre:

States.	Yield in 1869. (Census.)	Yield in 1872. (Estimated.)	Yield indicated by November returns.	Number of acres.	Yield per acre.
	<i>Bales.</i>	<i>Bales.</i>	<i>Bales.</i>		<i>Pounds.</i>
North Carolina .....	144,935	180,000	176,400	513,717	159
South Carolina .....	224,500	276,000	253,920	627,717	183
Georgia .....	473,934	595,000	577,150	1,453,577	184
Florida .....	39,789	47,000	45,590	167,584	126
Alabama .....	429,482	535,000	486,650	1,499,009	151
Mississippi .....	564,933	744,000	632,400	1,706,755	172
Louisiana .....	350,832	501,000	400,800	1,034,239	180
Texas .....	350,628	467,000	523,040	1,097,122	221
Arkansas .....	247,968	335,000	341,700	811,409	195
Tennessee .....	181,842	240,000	244,800	596,395	190
Total .....	3,008,848	3,920,000	3,682,650	9,509,524	

This aggregate, with the small quantity grown outside of the limits of the cotton States, will make the total estimate of the November returns, as nearly as possible, three million seven hundred thousand bales. As the weather and other circumstances continue to affect the ultimate outcome of the crop, in the more southern and larger States, until Christmas, the result may yet be modified by an exceptionally favorable season in the latter part of November and in December, on the one side, or by storms affecting injuriously the saving of the crop on the other. Low prices and scarcity of pickers may cause a remnant of the crop to be left in the field, as some correspondents have already suggested.

The yield per acre is much lower than usual in Alabama, Mississippi, and Louisiana. The average is always comparatively high in the latter State, the cotton acreage being almost exclusively on productive lands. This is also true of a large proportion of the cotton-fields of Arkansas. Mississippi gives a high rate of yield in the river counties, on the Yazoo and Big Black, and in the rotten-limestone lands of Hinds and Madison; but the counties of Eastern and Southern Mississippi, large in total area, but not in cotton acreage, make smaller yields and reduce the general average. In Texas the yields have always been reported high because cotton is generally planted on very productive soils, of which there is yet an abundant supply for selection.

VIRGINIA.—*Sussex*: Cotton-crop will be 50 per cent. greater than last year; a worm, heretofore unknown, stripped the leaves just before the cool nights of October. *Surrey*: Has opened well, and promises a good yield of good quality. *Greenville*: Shipped about 4,000 bales. *Dinwiddie*: Increase in acreage 30 per cent.; decreased yield per acre 10 per cent.; rain caused dropping of forms and rust. The quality of lint is good.

NORTH CAROLINA.—*Rutherford*: Yield and acreage 50 per cent. above average; quality very good. *Stanley*: Crop has grown well, but there is a lack of labor to save it; much will necessarily be left to destruction. *Chowan*: Shortened by rain and worms.



*Hamett*: Crop reduced to an average by wet. *Catawba*: Increased acreage will about make up deficiency in yield. *Craven*: Increased acreage will bring a deficient crop up to average. *Pitt*: Top crops taken by worms; boll-worm injurious; crop marketed early through necessity. *Tyrrell*: Below average; unpropitious season and caterpillars. *Beaufort*: Shortened by wet and caterpillars; fields that were expected to turn out 1,000 pounds per acre are realizing but 500 to 600; caterpillars saved the top-crop from the frost. *Alamance*: Plants had a fine stalk, but the season was too wet for their maturity. *Lenoir*: Short 10 per cent. *Gaston*: Satisfactory; yield of lint fair; frost October 20; damage not known. *Franklin*: Increased acreage will bring the crop up to last year's, or nearly so. *Davidson*: Late spring frosts kept back the crop too late to mature well. *Greene*: Low prices do not justify more than 40 cents per hundred for picking, a rate which does not attract laborers; yield a third below average and 25 per cent. below last year. *Granville*: Acreage three times that of last year; lint very good. *Haywood*: Did not mature well on the high table-lands. *Rowan*: Attacked by army-worms October 5 and stripped; opened unusually early. *Currutuck*: Prospect good till the army-worm came. *Paullico*: Army-worms have reduced a crop promising 20 per cent. increase to last year's standard; rain and rust also injurious as well as the money panic. *Northampton*: Good weather has opened the crop more freely of late; second picking good. *Martin*: Yield small; quality good. *Perquimons*: Half crop in yield, but increased acreage will carry it to 70 per cent. probably; cotton won't pay at less than 15 cents per pound.

**SOUTH CAROLINA.**—*Edgefield*: Season fine for picking. *Williamsburgh*: Miserably poor; half of last year's crop will not pay cost. *Lexington*: Below last year; ran to weed, and was afterward eaten by worms. *Georgetown*: "Santee grades," approximating long staple or sea island, have done well. Short staples have also proved remunerative. *Marion*: Overrun by grass in the spring and early summer; stripped by caterpillars on the more improved lands. *Marlborough*: Injured by frosts and worms, but the yield probably equal to last year's. *Newberry*: Better than was expected; much rust in gray lands. *Barnwell*: Will average about 475 pounds of seed-cotton per acre. *Richland*: Hardly equal to last year. *Laurens*: Four-fifths will average middling; very little yellow cotton.

**GEORGIA.**—*Jackson*: Late fall and fair weather will bring an average crop. *Putnam*: Late cotton taken by caterpillars. *Twiggs*: The most disastrous cotton year since 1840. *Stewart*: Shortened one-half by wet and worms. *Macon*: Falling price, and product very discouraging. *Hall*: Best picking season yet known. *Floyd*: Injured slightly by late killing frosts, the top-crop having been swept by caterpillars; fine picking season. *Fulton*: Yield unexpectedly large; lint fine; good fall season; picking will be finished a month earlier than usual; half the crop sold. *Spalding*: Quality 20 per cent. better than last year; fine picking season. *Hart*: Increased acreage will bring the crop to last year's average. *Walton*: Season unusually favorable for maturing and gathering the crop; increased acreage will balance the decreased yield. *Taylor*: Acreage increased 10 per cent.; worms nearly ruined the crop. *Dooley*: Cotton a failure, but the "Peeler" has done well; it should be planted very early. *Schley*: Short crop; will be picked by November 10. *Upson*: About 15 per cent. better than last year, yielding 125 pounds of lint per acre; some lands reach 1,000 pounds, and others sink to 75. *Wilkes*: Remarkably good picking season; frosts injure late cotton, but the exposed area is not large; labor scarce and unreliable. *Gwinnett*: Fine season; crop equal to last year, though the weed is not so large; mostly picked without rain or stain. *Muscogee*: Shortened by caterpillars. *Marion*: Shortened by caterpillars. *Oglethorpe*: Below last year; excessive early summer rains; shedding; early frosts, &c. *Whitfield*: Good; nearly all picked. *Richmond*: Lint on strong red lands may average 250 pounds; on gray lands not over 100. *Johnson*: Cut off to some extent by caterpillars. *Dawson*: Average increased; Peeler from the Department is large, well balled, and yields good lint, but it is late. Picking season fine. *Carroll*: Fine picking season; heavy frost October 19. *Liberty*: Injured by rain. *Murray*: Lint fine; 1½ pounds lint to every 3 pounds seed-cotton.

**FLORIDA.**—*Manatee*: Much injured by storm October 6. *Hillsborough*: A little injured by rain. *Taylor*: Caterpillars have nearly stopped cotton-culture. *Jefferson*: Caterpillars had stripped the leaves, permitting the late storm to blow out the lint badly, reducing the yield very greatly. *Gadsden*: Reduced by the storm of September 19 to half an average, and one-fourth below last year. *Wakulla*: Ten per cent. above last year in spite of caterpillars and the September gale; a few unsuccessful experiments with Paris green. *Madison*: Reduced by storms. *Jackson*: One hundred pounds seed-cotton yield 31 of lint. *Putnam*: Black-seed or long-staple cotton is a money-crop in the western part of the county.

**ALABAMA.**—*Bullock*: Better than usual. *Perry*: Below expectations. *Lewiston*: Little over a half crop; quality better than usual; picking early. *Lawrence*: Probably below average. *Chambers*: Caterpillars ruined the top-crop and did other damage. *Crenshaw*: Fair crop; 1 bale of lint to 3 acres. *Choctaw*: Shortened by caterpillars. *Clinch*: Cut down one-half by wet weather and caterpillars. *Worth*: Shortened by

rust and caterpillars; cotton-culture very unpromising. *Blount*: Best crop ever produced here; caterpillars ate the leaves, but this only hastened the ripening of the bolls; fine picking weather. *Pike*: Less than expected; seed injured by ravages of worms on the stalks. *Saint Clair*: Peeler cotton on good uplands produces 1,400 pounds of seed-cotton per acre. *Coffee*: Good season; late cotton injured by caterpillars; crop 25 per cent. better than last year. *Wilcox*: Half crop. *Montgomery*: Unprecedented falling off; picking time good. *Conceh*: About 150 pounds lint per acre; slow marketing; holding up for better prices. *Franklin*: Will sample better than last year. *Calhoun*: Injured by worms, but not nearly so bad as last year. *Talladega*: Shortened by caterpillars. *Dallas*: Considerable acreage stripped by caterpillars.

MISSISSIPPI.—*Lee*: Shortened by drought, caterpillars, and boll-worms; very few acres produced a bale. *Jefferson*: Short through worms and panic. *Hancock*: Staple fine. *Jones*: Better than was expected. *Pike*: Curtailed by rain, grass, and army and boll worms. *Jasper*: Shortened by caterpillars; marketed promptly. *Grenada*: Greatly injured by drought, rust, and worms, together with poor culture and inefficient labor. *Claiborne*: Full average. *Wilkinson*: Gathered very early. *Tishomingo*: Freer from dirt than usual. *Lowndes*: A failure. *Rankin*: Upland Peeler, on cow-penned land, produced 1,600 pounds per acre of seed-cotton; no better than other cotton beside it. *Bolivar*: Severe frost October 28; no top crop of consequence; caused by shallow plowing. *Clark*: Good picking season; worms took the top crop; first killing frost October 28; next night ice was formed half an inch thick.

LOUISIANA.—*Caddo*: Fall fine; most of the crop gathered; about half average. *Bossier*: Severe frost October 28, but most of the cotton had been saved. *Tensas*: Shortened by worms and rot—dry or black rot. This disease is unexplained. It prevailed in poor, worn-out soil; new or highly fertilized land was but little affected. *East Baton Rouge*: Half crop; fine picking season. *Morehouse*: Two-thirds of a crop; fair picking weather. *Claiborne*: Boll-worms still more destructive than caterpillars. *West Feliciana*: Ruined by worms. *Tangipahoa*: Short; first killing frost October 28. *Iberia*: No cotton coming to market. *Rapides*: Half last year's yield; staple short and stunted; much rot. *Franklin*: Lint averages about 180 pounds per acre. *Grimes*: Low prices have caused much of the crop to be left in the field. *Assumption*: Injured by rain and worms. *Corcordia*: Half crop.

TEXAS.—*Rusk*: About 25 per cent. below average. *Ellis*: Increased acreage will bring up the yield to 50 per cent. above last year's, if the whole crop should be gathered; it will all be gathered in November. *Brazoria*: Spring frosts, summer rains, and worms have about destroyed the crop. *Cooke*: Lint good; early frosts will damage the crop; thermometer showed 27° on the morning of October 29. *De Witt*: Fine west of the Guadalupe, but the scarcity of labor causes great difficulty in getting the crop in. A large area has produced one bale of 500 pounds per acre. *Williamson*: Frost and ice October 23, killing one-fourth of the cotton. Difficult to get hands to pick cotton where poisons have been used to kill insects, and hence a few or no efforts of that kind have been made. *Montgomery*: On some farms, with a free use of Paris green, the crop turned out as high as 1,400 or 1,500 pounds per acre; on some pine and red-oak lands the yield was as low as 300, having been overrun with weeds. *Coryell*: Will average 300 pounds per acre; would have been a very large crop but for heavy rains. *Red River*: Opening finely in the nice weather. *Collin*: Season favorable for gathering cotton and for maturing late crops. *Milam*: Average, but below expectation. *Henderson*: More favorable than last report; three-fourths average; good picking season. *Dallas*: Fine; good harvest weather; lint of average quality. *Parker*: Yield 250 pounds per acre of lint; about the same as last year; acreage largely increased. *Upshur*: Short, but yields an unusual proportion of lint, 33½ per cent. *Caldwell*: Insects less injurious than was supposed; many crops yield over a bale per acre; lint better than for years. *Kendall*: Acreage largely increased; plants short, but bolls plentiful and remarkably clean. *McLennan*: Largest crop yet raised; reliable reports of 750 pounds of lint per acre; picking behindhand. *Lavaca*: Excessive rains and worms; lack of labor to gather the crop and storms are beating a portion of it out; present system of cropping unsatisfactory. *Burnet*: Promises well, but there is a lack of pickers. *Matagorda*: But little cotton will be saved; lack of reliable labor in gathering; Peeler sustains its high character. *Lamar*: The wet spring caused a considerable acreage to be lost after planting. *Marion*: Better than was expected since the worms disappeared. *Medina*: Some damage by army-worms and rain. *Austin*: Crop late; where the worms were not destructive a heavy top-crop will require the whole month to pick.

ARKANSAS.—*Drew*: The money panic will prevent some farmers from gathering their crops. *Franklin*: Above average in quantity, but deficient in quality of lint. *Perry*: Recent freezes severe. *Baxter*: Early frosts have arrested the opening of cotton. *Bradley*: Below average, but quality better than last year; picking well advanced. *Prairie*: Better than was expected. *Arkansas*: Injured by drought in timber lands; good on bottoms. *Monroe*: Yield better than was anticipated; below



average, but better than last year. *Cross*: Not over 75 per cent. of an average; injured by spring rains and summer drought: *Craighead*: A gain in lint over last year. *Garland*: Shortened 15 per cent. in quantity and 30 per cent. in quality by drought and army-worms. *Hempstead*: Damaged greatly by worms; fiber generally short but sound and clean. *Crittenden*: Late and caught by frost. *Little River*: Damaged by wet spring; worms took the top-crop, cutting down the yield at least 10 per cent.

TEXNESSEE.—*Lauderdale*: Not so good as was expected. *Haywood*: No top-crop; crop cut short a third by drought following excessive rains; 15,000 bales last year; middling now selling at 10 cents. *Shelby*: Damaged 50 per cent. by caterpillars and boll-worms. *Hancock*: Does well on sunny slopes and river-bottoms. *Obion*: Best crop for ten years. *Giles*: Fine gathering season. *Lincoln*: The yield will be larger than last reported; fine picking season. *Putnam*: Unusually good. *Fayette*: Cotton but two-thirds of a crop.

KENTUCKY.—*Graves*: Cotton culture increasing.

MISSOURI.—*Ripley*: Will market 500 bales against 200 last year. *Stoddard*: A little below average, but the large increase of acreage raises the aggregate yield to 120, as compared with last year. *Dallas*: Cotton culture increasing. *Pemiscot*: Three times the acreage of last year, but the yield per acre was below average; frost cut short the crop at least 10 per cent.

KANSAS.—*Labette*: Cotton quite a success in a small way. *Montgomery*: Cotton would pay if there were gins accessible.

## POTATOES.

Our returns make the average product of potatoes throughout the country 15 per cent. less than last year. As the crop was then estimated 113,516,000 bushels, a falling off of about 17,000,000 bushels is indicated. The product equals that of 1872 in Delaware; exceeds it in New Hampshire, Virginia, Arkansas, and Oregon, 103; Vermont, 122; Massachusetts and Connecticut, 101; New Jersey and Georgia, 102; South Carolina, 104; Florida, 125; and Alabama, 116; is less in Maine, 82; Rhode Island, 90; New York, Pennsylvania, and Wisconsin, 95; Maryland and California, 96; North Carolina and Texas, 92; Mississippi, 99; Louisiana and Tennessee, 97; West Virginia, 93; Kentucky, 81; Ohio, 78; Indiana, 80; Illinois, 57; Minnesota, 75; Iowa and Nebraska, 40; Missouri, 58; Kansas, 46. The variations from last year's product in some of the principal potato-growing States are about as follows: Increase—Vermont, 918,000 bushels; decrease—New York, 1,187,000; Pennsylvania, 558,000; Kentucky, 408,000; Ohio, 1,705,000; Indiana, 560,000; Illinois, 4,157,000; Minnesota, 553,000; Iowa, 3,979,000; Missouri, 1,132,000; Kansas, 2,051,000; Nebraska, 575,000. In all sections the quality, except where affected with rot, is represented as superior. Among the causes of diminished product are specified: Maine, Waldo County, drought and frost; New York—Washington, Yates, Tioga, and Ontario, rot; Albany, drought; New Jersey—Hudson, drought; Mercer, drought and rot; Pennsylvania—Cumberland, Wyoming, Northampton, Lehigh, Bucks, and Lancaster, rot; Elk, Lawrence, Fayette, and Armstrong, beetles; Maryland—Dorchester and Baltimore, drought; Virginia—Orange, frost and drought; Highland, rot, worms, and beetles; Texas—Burnet, grasshoppers; Arkansas—Garland, beetles and rot; Tennessee—Dickson and Coffee, drought; Hickman, rot; West Virginia—Burleigh, Brooke, and Baxter, insects; Mongolia, rot; Kentucky—Shelby, drought; Anderson and Livingston, Colorado beetle; Ohio—Washington, Franklin, Medina, Loraine, Crawford, Geauga, Hamilton, and Mercer, Colorado beetles; Fulton, Henry, Wyandotte, and Mercer, drought; Michigan—Mason, drought; Ottawa and Oceana, drought and beetles; Calhoun, beetles; Indiana—Warren, and Brown, drought; Martin, Owen, and Ohio, drought and beetles; Illinois—Henry, drought; Tazewell, Mason, and Boone, drought and bugs; Clinton, bugs and wet; Sangamon, beetles; Cass

reports the lightest, and Knox the poorest, crop ever raised; Lee, almost a complete failure; Wisconsin—Washington, drought and beetles; Calumet and St. Croix, beetles; Richland reports that winter had set yet in, and Outagamie that the snow was a foot deep, and many fields not dug; Minnesota—Kandiyohi, drought and beetles; Redwood, drought and grasshoppers; Martin, grasshoppers; Iowa—Ringgold, Clarke, Montgomery, Boone, and Louisa, drought; Harrison, drought and grasshoppers; Fayette, Audubon, and Winneshiek, drought and beetles; Plymouth, grasshoppers; Story and Benton, early frosts; Missouri—Baxter, Perry, and Maries, drought; Pettis and Maries, beetles; Baxter, Adair, Laclede, and Stone report half a crop; Clinton one-fifth, and Anderson an entire failure; Kansas—Miami, Clay, Bourbon, Labette, and Montgomery, drought; Smith, beetles, worms, and grasshoppers; Nebraska—Pawnee and Nemaha, drought; Thayer, beetles and frost; throughout the three States last named early plantings appear to have produced much better in yield and quality than late. In California—San Luis Obispo, the crop was greatly injured by grasshoppers, and in Oregon, Tillamook, by blight. Returns from the Territories are generally favorable, but Deer Lodge, Montana, reports one-third of the crop frozen in the ground in September, and in Clallam, Washington, the rot had appeared for the first time.

The following are specimens of current prices reported: Vermont—Orleans, 35 cents per bushel; Indiana—Perry, 75 cents; Illinois—Whiteside and Bureau, \$1.25; Macon, \$1.40; Hancock, \$1.20; Iowa, Ringgold, 75 cents; Pottawattamie, 60 to 80 cents; Des Moines, \$1 to \$1.20; Kansas—Coffee, 80 cents; Nebraska—Adams, 65 to 95 cents; Otoe, \$1 and rising; Idaho—Nes Perces, 50 to 75 cents.

MAINE.—*Waldo*: Light crop; shortened by drought and frost. *Oxford*: Crop light, but of good quality. *Piscataquis*: Will fall short a tenth; some plantings of extra yield and quality; one farmer raised 390 bushels per acre. *Androscoggin*: Crop light, but good. *Cumberland*: Yield large, quality excellent.

NEW HAMPSHIRE.—*Hillsborough*: Crop large and good. *Carroll*: Turned out splendidly; one farmer raised 375½ bushels per acre of fine tubers; one weighed 3¼ pounds.

VERMONT.—*Lamoille*: Unusually good; larger percentage of starch than usual, with less rot. *Rutland*: Crop large and excellent. *Essex*: Never better. *Franklin*: Most excellent; marked contrast with last year. *Orleans*: Very ripe and good; selling at 35 cents per bushel at the starch factories.

MASSACHUSETTS.—*Berkshire*: Of good quality, but shortened by drought. *Franklin*: Good; average 50 cents per bushel. *Norfolk*: Abundant, and of better quality than for several years.

CONNECTICUT.—*Windham*: Never finer.

NEW YORK.—*Yates*: Yield fully up to last year; many tubers diseased. *Seneca*: Yield moderate, quality good. *Warren*: More sound than common. *Chemung*: Well matured on light dry soils, but not on heavy clay or strong loam. *Washington*: Peerless and late Rose rotting badly; price low. *Tioga*: Earlier varieties rotted on loam soils, on account of wet. *Saint Lawrence*: Excellent. *Erie*: Well harvested and closely sold up at 40 and 50 cents per bushel. *Columbia*: Fine in yield and quality. *Rockland*: Early plantings a half crop; late much better and of good quality. *Genesee*: Very fine. *Albany*: Suffered from drought. *Ontario*: Yield light; more or less rot. *Wyoming*: Did well. *Otsego*: Potatoes a fine large crop. *Alleghany*: Very short.

NEW JERSEY.—*Atlantic*: Unusually good; abundant rain since August. *Mercer*: Early potatoes shortened by drought; late plantings yielded heavily, but the quality was materially damaged by rot. *Burlington*: Late potatoes have done well; Early Rose, planted June 26, received the first premium at our county fair; White Peach Blows, planted July 2, were the best I ever saw. *Union*: Early Rose a very short crop; Peach Blows came out better than was expected. *Hudson*: Slightly injured by summer drought.

PENNSYLVANIA.—*Cambria*: Much affected by rot; one farmer lost 1,500 bushels. *Clinton*: Good, and in some cases extraordinary, especially the "Peerless." *Northumberland*: Better than last year and a fourth more in yield. *Wyoming*: On grass lawns rotting very badly. *Northampton*: Yielded better than last year, but three-fourths of the crop affected by dry rot. *Elk*: Considerably injured by bugs. *Beaver*: Crops light; tubers small. *Lawrence*: Half a crop, and poor quality from bugs. *Fayette*:



Injured by bugs. *Armstrong* : Tops bug-eaten or otherwise injured before the tubers ripened, especially late plantings. *Lehigh* : Rotting very much, especially Pink Eyes : Early Rose and Prince Albert least affected. *Jefferson* : Yield and quality good. *Lycorning* : Yield less than last year, but quality remarkably good. *Bucks* : Late potatoes rotting badly. *Lancaster* : Wet weather just before harvesting reduced the crop from near an average by causing rot.

DELAWARE.—*Kent* : Yield and quality good.

MARYLAND.—*Howard* : Late potatoes good ; early ones very poor. *Dorchester* : Late potatoes excellent ; early plantings shortened by drought. *Baltimore* : Late potatoes very fine ; early ones shortened by drought. *Washington* : Large crop.

VIRGINIA.—*King and Queen* : Crops larger and better than last year. *Madison* : Abundant and good. *Spottsylvania* : Best crop for years. *Rockbridge* : Very fine. *Henrico* : Very fine, especially late plantings. *Orange* : Early Rose cut short by frost and drought. *Goochland* : Above average. *King George's* : Excellent. *Highland* : Injured by rot, worms, and bugs. *Clarke* : Exceeds last year's crop both in quantity and quality.

NORTH CAROLINA.—*Tyrrel* : Only early crops made. *Franklin* : Second crops good.

SOUTH CAROLINA.—*Fairfield* : Spring crop very good ; late about average. *Orangeburgh* : Large and fine.

GEORGIA.—*Jackson* : Crop large, but poor in quality. *Muscogee* : Suffered from grass and then from drought. *Whitfield* : Too dry for potatoes.

ALABAMA.—*Lewiston* : Full average. *Crenshaw* : Average. *Calhoun* : Very fine.

TEXAS.—*Grimes* : Average. *San Saba* : Good. *Wood* : Very fine. *Burnet* : Destroyed by grasshoppers.

ARKANSAS.—*Bradley* : Increased average and improved quality. *Arkansas* : Crop good and well secured. *Cross* : Below average, but better than last year. *Garland* : Planted largely, but shortened by bugs and rot.

TENNESSEE.—*Dickson* : Late plantings shortened by drought ; early plantings good. *Fentress* : Yield and quality good. *Hickman* : Half crop : rotted in the ground. *Haywood* : Too much rain in June. *Wilson* : Not so good as last year. *Wilkinson* : Decline in yield 60 per cent ; increase in acreage 10 per cent. *Blount* : Short of last year 25 per cent. *Greene* : Crop good and sound. *Coffee* : Shortened by drought. *Putnam* : Crop large and fine.

WEST VIRGINIA.—*Raleigh* : Turned out finely. *Mercer* : Damaged by insects. *Pleasant* : Few planted for fear of bugs ; yield good. *Marion* : Much better than usual where they escaped the bugs : fine, large, and good quality. *Brooke* : Good quality, but small ; foliage devoured by Colorado beetles. *Jefferson* : Well matured, escaping frost. *Braxton* : Quality as good as last year, but the yield was reduced by bugs. *Monongalia* : Good, but some complaints of rot. *Harrison* : Excellent. *Tyler* : Product and quality good in spite of bugs.

KENTUCKY.—*Hardin* : Late plantings not a fifth of a crop. *Shelby* : Shortened by drought. *Laurel* : Very fine. *Lincoln* : Very fine. *McLean* : Injured by extreme wet weather. *Logan* : Very good. *Fayette* : Quality good, but yield below expectation ; surplus selling at 60 cents per bushel. *Anderson* : Shortened by Colorado beetles. *Johnson* : Late planting good. *Owsley* : Never better. *Livingston* : Eaten by bugs. *Jackson* : Above average. *Jefferson* : Injured by bugs ; northern seed make the best crop : native seed produced small tubers.

OHIO.—*Washington* : Injured by Colorado beetles. *Fulton* : Late planting and dry summer injured the crop greatly. *Franklin* : Greatly shortened by Colorado beetles. *Medina* : Reduced acreage ; Colorado beetles destructive ; half a crop. *Coshocton* : Good condition ; reduced acreage. *Erie* : General yield light ; I harvested 375 bushels from an acre with Carrier's potato-digger. *Wood* : Ten per cent. below last year's crop, which was but half average. *Lorain* : Used up by Colorado beetles in many cases. *Crawford* : Injured by bugs ; unfavorable season. *Geauga* : Injured by bugs ; where these kept away the crops were excellent in quantity and quality. *Henry* : Early Rose did well ; Peach Blows suffered from drought. *Wyandot* : Too dry for potatoes. *Lawrence* : Full-grown and abundant. *Hamilton* : Very badly injured by Colorado beetles. *Perry* : Above average in quantity and quality. *Mercer* : Injured by bugs and drought.

MICHIGAN.—*Shiawassee* : Many fields not yet harvested, though covered with snow. *Mason* : Late plantings shortened by drought. *Lapeer* : Best crop for several years. *Cathoun* : Fair crops were secured by those who destroyed bugs. *Jackson* : Generally secured in good order. *Ottawa* : Injured by bugs and drought. *Oakland* : Good crop of good quality ; early varieties best. *Oceana* : Suffered severely from drought and bugs. *Antrim* : Never better. *Berrien* : Short, but of good quality.

INDIANA.—*Owen* : Less than half average ; excessive rains, then drought, then frosts. *Dubois* : Turned out well, especially early varieties. *Miami* : Short. *Montgomery* : Acreage reduced by late planting season ; yield good. *Ripley* : Short, but fine quality. *Perry* : Small yield ; price 75 cents per bushel. *Warren* : Half crop ; drought. *Gibson* : Enough for home consumption ; yield and quality fine. *Hamilton* : Scarce and fine.

*Martin*: Shortened by drought; bugs the whole season. *Steuben*: Colorado beetles not so destructive as formerly. *Wells*: Half crop, but excellent. *Brown*: Shortened by drought, but excellent; worth 60 to 70 cents per bushel. *Dearborn*: Early and medium plantings fair; late a failure. *La Porte*: Yield larger and better than last year in spite of bugs and drought. *Ohio*: Injured by drought and Colorado beetles.

ILLINOIS.—*Kankakee*: Almost a failure. *Fayette*: Good quality, but a little below average. *Pike*: Very short and poor. *Whitesides*: Very scarce; worth \$1.25; half the home consumption must be imported. *Tazewell*: Shortened by drought and bugs. *Macon*: Almost a failure; only early plantings gave any return; shortened by drought and bugs; selling at \$1.40 per bushel. *Putnam*: Almost destroyed by drought and bugs. *Bureau*: Almost a failure; sold at \$1.25 per bushel. *Saugamon*: Greatly shortened by Colorado beetles. *Henry*: Shortened and depreciated in quality by drought. *Ogle*: Scarce, but good; selling at 75 cents to \$1 per bushel. *Winnebago*: Late plantings did not mature. *Cass*: Lightest crop ever known here. *Edwards*: Yield large, but of poor quality. *Hancock*: Selling at \$1.20 per bushel. *Knox*: Poorest crop ever raised here; Peach Blows hardly returned their seed; Peerless did better. *Mason*: A failure through drought and bugs. *Boone*: Shortened by drought and bugs; selling at 60 to 80 cents. *Clinton*: Injured by bugs and wet. *Lee*: Nearly a complete failure.

WISCONSIN.—*Clark*: Season too short. *Richland*: Many fields not dug and winter begun. *Calumet*: Early Rose least effected by the bugs. *Dodge*: Great variation in the field from 75 to 110 per cent. *St. Croix*: Reduced acreage; quality good; Colorado beetles troublesome. *Walworth*: Moderate crops of good quality. *Outagamie*: It looks as though root crops would remain undug all winter; snow 12 inches deep. *Green Lake*: Very fine. *Washington*: Early plantings average where the Colorado beetles were killed; Peach Blows greatly shortened by drought.

MINNESOTA.—*Kandiyohi*: Almost a failure through drought and bugs in some portions of the county. *Steele*: Average and of the finest quality; acreage increased. Colorado beetles not very injurious. *Redwood*: Almost a failure through drought and grasshoppers. *Martin*: Injured by grasshoppers.

IOWA.—*Shelby*: Poorest crop yet known. *Ringgold*: Injured by extreme drought in summer and very scarce; sell at 75 cents per bushel. *Story*: Damaged by the backward spring and early frosts. *Clarke*: Badly injured by summer drought. *Decatur*: Nearly a failure. *Harrison*: Acreage reduced on account of low prices; crop almost a failure through drought and grasshoppers. *Mills*: Half a crop. *Montgomery*: Injured by drought. *Boone*: Almost a failure through drought. *Fayette*: Injured by drought and Colorado beetles; early plantings best. *Hardin*: Early plantings best; Peach Blows light. *Audubon*: Shortened by late spring, summer drought, and bugs; tubers small and poor. *Benton*: Late plantings destroyed by early frosts. *Plymouth*: Injured by grasshoppers. *Linn*: Crop very short; quality excellent. *Des Moines*: Selling at \$1 to \$1.20 per bushel. *Pottawattamie*: Shortened by Colorado beetles; selling at 60 to 80 cents per bushel. *Winnesheik*: Early plantings good; late a light crop on account of bugs and drought in the latter part of the season. *Louisa*: Early plantings good; late plantings injured by drought. *Marion*: From one-eighth to half a crop. *Monona*: Crops large and fine. *Guthrie*: Half a crop but very good in quality. *Calhoun*: Very few in the hill.

MISSOURI.—*Caldwell*: Early planting good; Scotch russets good; Peach Blows poor. *Adrain*: An entire failure. *Platte*: Early plantings did well; late plantings scarce return their seed. *Clinton*: One-fifth of last year's crop; tubers small and inferior. *Harrison*: Short but good. *Baxter*: Reduced by drought to a half crop. *Douglas*: Early potatoes good; late a failure. *Pettis*: Suffered greatly from Colorado beetles. Some success in the use of powder, glass, and coarse flour, dusted on the vines through a fine cloth, while the dew was on. Care should be taken not to inhale the glass-dust. *Adair*: Half crop, but good quality. *Howard*: No potatoes worth mentioning, except the Early Rose. *Perry*: Late planting a failure through drought. *Phelps*: Early plantings good; late nearly a failure. *Frauklin*: Average yield and quality. *Maries*: Injured by bugs and drought, but partially recovered before harvest. *Laclede*: About 50 per cent. short. *Stone*: Half crop and poor. *Dallas*: Only early varieties planted; hence the drought was too late for serious injury. *Newton*: A little better than last year in quantity, but quality not so good. *Cole*: Late plantings failed, except in a few bottoms.

KANSAS.—*Miami*: Greatly shortened by summer drought. *Clay*: Much injured by drought; early frosts. *Bourbon*: Shortened by drought. *Shawnee*: Late plantings almost worthless. *Washington*: Almost a failure. *Jefferson*: Early plantings good; late almost a total failure. *Labette*: Early plantings good; late poor; *Linn*: Early plantings of early varieties did well, but late was injured by drought. *Montgomery*: Shortened one-half by drought. *Woodson*: Total failure on many farms; bottoms that last year returned 300 bushels per acre yielded only 50. *Coffey*: Early plantings fair; late a fourth of a crop; selling at 80 cents per bushel. *Republic*: Early Rose average; late plantings short. *Cowley*: Early plantings good; late ones tolerable. *Osage*: Nearly all plantings after May 1 are worthless. *Smith*: In the south part of the



county early crops were injured by bugs and worms, and late ones by grasshoppers. In the north part Early Rose, Buckeyes, and Peach Blows did best. *Riley*: Almost a failure. *Neosho*: Early plantings good; late a complete failure, except in low lands.

NEBRASKA.—*Johnson*: Nearly a failure. *Thayer*: Almost a failure; hogs very injurious. *Pawnee*: Shortened by drought four-fifths; dryest season for fifteen years. *Adams*: Ten per cent. better than in the river counties; 65 to 95 cents per bushel. *Antelope*: Early varieties did well; late ones nearly a failure. *Nemaha*: Late plantings ruined by drought; early good but limited in acreage; late varieties frosted. *Cass*: Almost a failure. *Otoe*: Almost a failure: \$1 per bushel and rising.

CALIFORNIA.—*Alameda*: Full average and good. *San Luis Obispo*: Greatly injured by grasshoppers.

OREGON.—*Tillamook*: Greatly injured by blight

COLORADO.—*El Paso*: Potatoes have produced enormously in some localities, while in others they will not grow at all. *Larimer*: Almost a failure.

UTAH.—*Kane*: Late rains have made the best crop for years. *Morgan*: Crops good, but acreage decreased. *Weber*: Excellent.

DAKOTA.—*Clay*: Injured by hogs and drought.

IDAHO.—*Ada*: Injured by frosts. *Nez Percés*: Crop all that could be asked; yield abundant and excellent, selling at 50 to 75 cents per bushel.

ARIZONA.—*Yavapai*: Increased by late rains.

MONTANA.—*Deer Lodge*: One-third of the crop frozen in the ground in September; fortunately there is a large surplus.

NEW MEXICO.—*Mora*: Drought restricted planting.

WASHINGTON.—*Thurston*: Rotted in low ground. *Clallam*: Rot for the first time.

## SWEET POTATOES.

This crop was a fair one both in yield and quality. The States having the highest per cent. of product compared with last year are Texas, 125; South Carolina, 116; Georgia, 114; Alabama, 112; Florida, 110; West Virginia, 107; the lowest, New Jersey, 60; Iowa, 77; Missouri, 81. The other States in which they are grown range between these figures.

NORTH CAROLINA.—*Chowan*: Half crop. *Craven*: Damaged by rain. *Tyrrel*: Below average. *Greene*: Poorest crop ever housed. *Haywood*: Best crop ever known.

SOUTH CAROLINA.—*Georgetown*: Yield increased 10 per cent. *Fairfield*: Average.

GEORGIA.—*Jackson*: Full average. *Spalding*: Fine. *Liberty*: Injured by rain.

ALABAMA.—*Lewiston*: Full average. *Crenshaw*: Twenty-five per cent. above average. *Clinch*: Very good. *Wilcox*: Doing well. *Calhoun*: Injured by fall drought. *Clarke*: Better than last year.

MISSISSIPPI.—*Lee*: Heavy yield, fine quality; 150 to 200 bushels per acre; selling at \$1 per bushel. *Hancock*: Did well.

LOUISIANA.—*Rapides*: Inferior in yield and quality.

TEXAS.—*Rusk*: Tubers large but few to the row; too much vine. *Ellis*: Tubers abundant; of good size and quality. *De Witt*: Promising. *Milan*: Better than usual. *Upshur*: Fine quality and heavier crop than usual. *Kendall*: Very good. *Austin*: Large crop, but of quality inferior to last year's.

ARKANSAS.—*Fulton*: Improved by late rains. *Prairie*: Short. *Garland*: Fine yield.

TENNESSEE.—*Dickson*: Good quality, but shortened by drought. *Fentress*: Large yield, but not keeping well. *Hickman*: Fine. *Wilson*: Very fine; 20 per cent. above last year. *Blount*: Generally very good. *DeKalb*: Heavy crop, though injured by frost. *Coffee*: Shortened by drought. *Putnam*: Crop large and fine.

WEST VIRGINIA.—*Braxton*: About the same as last year. *Doddridge*: Injured by drought.

KENTUCKY.—*Laurel*: Very fine. *Logan*: Superb. *Fayette*: Fair. *Owsley*: Never better. *Livingston*: Tolerable; quality good. *Jackson*: Better than in any former year.

OHIO.—*Washington*: Increased acreage. *Lawrence*: Large and fine.

MICHIGAN.—*Berrien*: Short, but of good quality.

INDIANA.—*Ripley*: Plenty and good. *La Porte*: Less in quantity than last year, but better in quality.

ILLINOIS.—*Bureau*: Crop small, but good. *Cass*: Good. *Mason*: Good quality.

IOWA.—*Harrison*: Good yield and quality.

MISSOURI.—*Barter*: Fair.

KANSAS.—*Labette*: Decreased acreage; yield and quality good.

## HAY.

Maine and New Hampshire report the hay crop larger than in 1872; in the other New England States, and in New York, the quantity is less, but the deficit is probably fully made up by the superior quality. Rutland and Franklin Counties, Vermont, and Berkshire, Massachusetts, estimate that the yield, though smaller, will carry more stock through the winter. In Delaware and Missouri the product equals that of last year; in Kentucky, Ohio, Michigan, Illinois, Wisconsin, Kansas, and Nebraska, it falls below; in the remaining States it is above. Those in which the per cent. of gain, compared with 1872, is greatest, are: Texas, 160; Oregon, 133; South Carolina, 130; Virginia, 125; Alabama, 123; Maryland, 116; Tennessee and California, 115; West Virginia, 114; New Hampshire, 110; Maine, 108. Those in which the per cent. of loss is greatest: Rhode Island, 82; Vermont and Massachusetts, 88; Wisconsin, 90; Illinois, 91; New York and Kansas, 93.

With rare local exceptions the returns throughout represent the quality and the condition in which it was cured as better than in 1872. In New Jersey, Gloucester, the first crop was shortened by drought, but the second was heavy. In Pennsylvania, Wyoming, the crop was never better; Armstrong, the deficiency of the first crop was made up by the second. In Virginia, King and Queen and Madison, report the crop both larger and more nutritious than last year; Dinwiddie, increased attention to the production of hay; and similar reports come from Craven, North Carolina, and Orange, South Carolina. In Florida, Richmond, the yield of cow-pea hay and Hungarian grass was 100 per cent. greater than last year. In Texas the hay-crop was abundant in every county reporting. Hamilton reports that the indigenous mesquite-grass excels the blue-grass from the North; Grimes, that the quantity of hay saved is increased year by year; Titus, that experimental hay-crops have yielded astonishing results; Coryell, more hay saved than ever before; Parker, sixty tons of Hungarian-grass raised by one farmer on twenty acres; Collin, considerable shipments of prairie-hay. In Arkansas, Fulton, Italian rye-grass from the Department succeeded finely. In Tennessee, Wilson, Hungarian-grass and millet of different kinds, especially German, were very productive; Wilkinson reports an increase of 50 per cent. in acreage, and of 30 in yield. The only specially adverse report from this State is from Coffee, "the third short hay-crop; no winter-grass for stock." In Ohio, Washington reports meadows, and Mercer timothy, nearly run out, owing to three successive droughts; Lorain, the crop ruined by grasshoppers, and Wyandot, by drought. The crop was cut short in Shiawassee, Michigan, by the backward spring; in Livingston, by winter-killing; and in Oakland, by the drought. In Perry and Edwards, Illinois, hay was shortened by the army-worm. Saint Croix, Wisconsin, reports that the acreage in hay increases annually, and Baxter, Missouri, an increase in the cultivation of tame grasses. Reports, respecting both quantity and quality, are generally favorable from Minnesota, Iowa, and Missouri. Clay, in Kansas, and Sage, in Nebraska, report large quantities of hay and wheat stacked in the field burned by prairie fires. In Tillamook, Oregon, the acreage is 100 per cent. greater and the yield greater than in 1872.

The quantity of hay produced this year in the United States is about 500,000 tons less than last, when it was not far from 24,000,000 tons. Much the largest part of the decrease indicated is in New York, being over 316,000 tons. But as the average quality is much better than last year, and as pasturage throughout the country, with a few limited excep-

tions, has been good during the autumn, stock, wherever reasonably cared for, may be expected to enter winter-quarters in good condition, and to maintain it until they come out.

MAINE.—*Waldo*: Extra in quantity and quality. *Piscataquis*: Average quantity, quality extra; fine harvest weather. *Androscoggin*: Crop good. *Sagadahoc*: Very good. *Cumberland*: Full average quantity and fine quality.

NEW HAMPSHIRE.—*Hillsborough*: Very fine; fall feed abundant; cattle will go to the barn with a better stock of hay than last year.

VERMONT.—*Rutland*: A little less in bulk than last year, but its fine quality makes it more valuable. *Franklin*: Less in quantity than last year, but will carry more stock through the winter.

MASSACHUSETTS.—*Berkshire*: Less in quantity, but of greater value than last year, on account of better quality; fine growing and harvest weather. *Plymouth*: First crop of hay small, but on good soils the second crop was large. *Norfolk*: Crop large and good; fall feed good.

CONNECTICUT.—*Windham*: Excellent; scarcely a drop of rain in harvest. *Hartford*: Average and of good quality; fall feed abundant.

NEW YORK.—*Yates*: More hay cut than last year; clover considerably injured by harvest rains. *Seneca*: Crop moderate but of good quality. *Chemung*: Ten per cent. better than last year's light crop. *Washington*: Larger second crop of hay than usual. *St. Lawrence*: Crop good and well secured; fall feed abundant. *Columbia*: From \$15 to \$20 per ton. *Rockland*: Short; selling at \$35 per ton. *Madison*: Fall feed good. *Genesee*: Second crop of clover good. *Albany*: Crop light. *Ontario*: Crop shortened by June drought. *Alleghany*: Short in the north half of the county; in the south half average.

NEW JERSEY.—*Atlantic*: Salt-hay and black-grass our main dependence. *Hunterdon*: Pasture better than ever known at this season. *Sussex*: Fully as much hay as usual has been secured, but the upland hay is not as good as usual; bottom crops more or less injured by rain after cutting. *Cumberland*: Hay but half average; timothy of good quality, but clover rather poor, being coarse and stemmy. *Gloucester*: First crop shortened by drought; second crop heavy. *Burlington*: Fall pasture good. *Warren*: Timothy good and well secured; clover short and badly secured. *Hudson*: Greatly injured by drought and ox-eye daisy; pastures benefited by late rains.

PENNSYLVANIA.—*Wyoming*: Crop never better. *Beaver*: Pastures better than for several years, and live-stock in better condition. *Lawrence*: Meadows injured by severe frosts. *Fayette*: Half crop, but good quality. *Armstrong*: Second crop of hay good, making up the deficiency of the first crop. *Jefferson*: Below average, but better than last year; fodder must be economically used. *Northumberland*: Large and fine yield. *Crawford*: Damaged by late spring frosts and afterward by drought.

MARYLAND.—*Howard*: Greatly improved by seasonable weather this year. *Carroll*: Pastures good. *Baltimore*: Crop shortened by drought, but better than last year.

VIRGINIA.—*King and Queen*: Crop larger and more nutritious than last year. *Pulaski*: Fall pastures good. *Fauquier*: Hay-crop good; pasturage holds out well. *Fairfax*: Crop below average from drought. *Rockbridge*: Late pastures good. *Henrico*: Crab-grass hay enough made to winter our cattle on. *Madison*: Largely in excess of last year; quality good. *Spottsylvania*: Hay and fodder crops large. *Pittsylvania*: Grass-crops never recovered from the July drought. *Lunenburg*: Little or no hay raised; cattle fed almost entirely on corn-fodder. *Goochland*: Hay-crop much greater than last year and fine. *Highland*: Yielded well; quality good. *Greenville*: Good hay season, but the cotton mania has restricted its cultivation; in some cases the grass is allowed to die without cutting. *Bath*: Hay extra. *Dimwiddie*: Season favorable to hay; increased attention to grass-crops.

NORTH CAROLINA.—*Craven*: Attracting more attention and an increased quantity secured; native grasses constitute the staple, but clover is becoming a favorite in some places. *Tyrrell*: Average in quantity, but inferior. *Forsyth*: Very fine, bringing 40 cents per hundred. *Robeson*: Only crab-grass cured.

SOUTH CAROLINA.—*Williamsburgh*: Short; lack of sunshine. *Marlborough*: Unusually fine. *Fairfield*: Hay abundant where saved. *Orangeburg*: More attention to hay; land too poor for blue-grass.

GEORGIA.—*Floyd*: Shortened by wet, especially clover. *Muscogee*: Crop considerably increased. *Oglethorpe*: Above average. *Whitfield*: Light, but of fine quality. *Richmond*: Yield of cow-pea hay and Hungarian grass double last year's; spontaneous summer grasses from 75 to 100 per cent. in advance of last year; few cultivated varieties.

ALABAMA.—*Montgomery*: Especially fine. *Calhoun*: Short but good.

LOUISIANA.—*East Baton Rouge*: Abundant and fine. *Iberia*: Hay \$5 to \$8 per ton.

TEXAS.—*Hamilton*: Our indigenous mesquite-grass excels the blue-grass from the North. *Grimes*: More hay saved every year. *De Witt*: Native grasses abundant and



fine. *Harris*: Native grasses choice and abundant. *Coryell*: More hay saved than ever before; wild pasture unusually fine, the live-stock being greatly reduced by being driven to Kansas. *Collin*: Considerable shipments of prairie-hay. *Bee*: Prairie-grass as good as for fifteen years past. *Milam*: Finest grass-crop for ten years. *Titus*: Experimental hay-crops have yielded astonishing results. *Parker*: Crop good; one farmer raised 60 tons of Hungarian grass on 20 acres. *Kendall*: Prairie-hay never better. *Kaufman*: Kentucky blue-grass fine; Lucerne bids fair; Italian rye-grass died out. *Austin*: Large quantity of hay made.

ARKANSAS.—*Fulton*: Italian rye-grass has done finely; prairie-grass as good as ever known.

TENNESSEE.—*Dickson*: Grew well, but yielded short. *Hickman*: Better than last year in quantity and quality. *Obion*: Hay a fine crop. *Wilson*: Annual grasses, such as Hungarian and different kinds of millet, yielded finely; German millet has done especially well. *Grundy*: Turned out remarkably well. *Giles*: Unusual yield of hay, and secured in No. 1 condition. *Wilkinson*: Increase of 50 per cent. in acreage and 30 per cent. in yield. *Blount*: A little short. *Sumner*: Immense hay-crop; large acreage in Hungarian grass and German millet; timothy never more abundant. *Greene*: Better than usual. *Lincoln*: Italian rye-grass from the Department growing finely; can scarcely be distinguished from grass growing on my farm for forty years. *Coffee*: The third short hay-crop; no winter-grass for stock. *Putnam*: Of excellent quality, and secured in prime condition. *Fayette*: Unusual amount of hay saved, especially wild grasses. *Robertson*: Timothy and herd-grass better than last year; clover not so good.

WEST VIRGINIA.—*Mercer*: A good hay-crop, and secured in good order. *Pleasants*: Damaged by rain in harvest. *Marion*: Fall pastures better than for three years. *Braxton*: Crop larger and better than last year. *Harrison*: Crop heavy, and secured in tolerable order; fall pastures not very good.

KENTUCKY.—*Oldham*: Below average, but secured in good order. *Logan*: Fine, and secured in good condition. *Fayette*: A little short, but of excellent quality. *Johnson*: Generally good. *Owsley*: Hay and grass crops very fine.

OHIO.—*Washington*: Meadows mostly run out; drought for three years has prevented their resetting. *Fulton*: Hay below average, but better than last year. *Medina*: Scarce. *Coshocton*: Above average, and secured in good condition. *Lorain*: Injured by grasshoppers; pastures very short. *Wyandot*: Shortened by drought. *Lawrence*: Light and scarce; brings \$22 per ton. *Perry*: Much above last year, and would have been greater but for floods last spring, especially on bottom-lands. *Mercer*: Timothy nearly ruined by three successive droughts.

MICHIGAN.—*Shiawassee*: Cut short by the backward spring; crop secured in good condition. *Mason*: Crop fine. *Lapeer*: Fair crop of good quality, and well secured. *Ottawa*: Good hay-crop. *Oakland*: Shortened by drought. *Antrim*: A good yield and quality. *Livingston*: Light; badly winter-killed; fall pasturage good and abundant.

INDIANA.—*Owen*: Injured by excessive rains. *Morgan*: Excellent. *Wells*: Injured by rains. *Brown*: Crop heavy, but injured by rain; worth \$10 per ton. *Dearborn*: Average, but injured by white-top and other weeds. *La Porte*: Shortened by early drought; quality brought to average by late rains. *Floyd*: Light. *Ohio*: Shortened by winter-killing and weeds, especially white-top daisy.

ILLINOIS.—*Pike*: Two-thirds of a timothy crop, but clover enough to make up the deficit; very late fall pasture fair. *Whiteside*: Light, but of excellent quality. *Perry*: Shortened by army-worms. *Henry*: Short, but excellent. *Edwards*: A large crop, but depreciated in value by army-worms; weedy. *Mason*: A good yield and quality; seldom better. *Piatt*: Pastures good. *Clinton*: Light, but well secured. *Lee*: Pastures poor.

WISCONSIN.—*Adams*: Timothy a half crop, but the excellence of the marsh-meadows made up for the deficiency. *Dodge*: Acreage reduced; quality depreciated by harvest rains. *Fond du Lac*: Clover-hay shortened by winter-killing. *St. Croix*: Acreage in hay annually increasing. *Walworth*: Light but of good quality. *Washington*: Early-cut clover was damaged by rainy weather; late-cut clover and timothy made excellent hay.

MINNESOTA.—*Steele*: Extra in quantity and quality. *Martin*: Heavy; good mowing prairie-hay on high lands.

IOWA.—*Decatur*: Saved in the best order. *Harrison*: Unusually good; mostly prairie. *Boone*: Excellent in yield and quality. *Appanoose*: Crop immense; from 200 to 500 acres of meadow on single farms; yield enormous and quality good. *Fayette*: Of splendid quality. *Hardin*: Grass-crop shortened by early frosts and prairie fires. *Plymouth*: Abundant and excellent. *Marion*: Saved in good order.

MISSOURI.—*Caldwell*: Very good and secured in fine order. *Manitou*: Fall pastures good. *Clinton*: Rains in May made the crop very good; good harvest weather. *Harrison*: Well saved. *Clay*: A good yield; saved in good order. *Baxter*: Good;

large quantity secured in good order: tame-grass culture increasing. *Phelps*: Very good. *Franklin*: Good. *Newton*: Shortened by drought; quality good. *Cole*: Splendid crop and secured in the finest order.

KANSAS.—*Nemaha*: Very large quantities put up and of superior quality. *Clay*: Large quantities of hay as well as wheat in the field burned by prairie-fires. *Jefferson*: Crop short but well secured and in good order. *Cowles*: Good, and got up in good condition.

NEBRASKA.—*Antelope*: Crop large and excellent; all of natural grasses. *Sage*: Much hay and stacked grain destroyed by prairie-fires.

CALIFORNIA.—*San Luis Obispo*: Pastures poor; without speedy rain live stock must suffer.

OREGON.—*Tillamook*: Acreage of hay double last year's; yield increased. *Douglas*: More or less injured by June and July rains; grass will be short the coming winter.

UTAH.—*Kane*: Hay, mostly alfalfa, a large crop, but late cuttings are inferior.

ARIZONA.—*Yavapai*: Increase of hay yield from late rains and more acres cut; all wild grass except 150 tons of Hungarian, alfalfa, &c. *Santa Ana*: A complete failure. *Thurston*: Abundant, but not well secured.

## SUGAR-CANE.

In all the Gulf States there are counties reporting the cultivation of sugar-cane to some extent. But outside of Louisiana it is evident that this production is small. In Georgia all the counties reporting show a crop in advance of last year's, which is probably the result of increased acreage, as injuries to the cane-crop are reported in some localities from drought and in others from excessive rains. In Florida, which returned 50 per cent. more sugar in the late census than Georgia, there was more variation in the yield, several counties reporting a decrease. Much injury was done to the crop by the severe gales of September. All the counties reporting sugar-cane in Alabama indicate an increased yield, but as the total crop of this State, reported in the census, amounted to only 31 hogsheads, this increase will but lightly affect the general aggregate. The same remarks apply to Mississippi to a still greater degree. In Louisiana, several of the larger sugar-producing parishes indicate a yield equal to last year's, while several smaller ones report an increase, but these indications are more than counterbalanced by adverse reports from several large parishes. Lafourche and Assumption, which, together, produced 18.62 per cent. of last year's crop of the State, (103,520 hogsheads, according to Bouchereau,) this year show a decline, the former of 15 and the latter of 20 per cent. Several counties in Texas, whose sugar-crop was too small to find a place in the census, indicate a greatly increased yield, but counties producing much larger crops report a serious decline. Brazoria, for instance, which returned 1,423 hogsheads of the 2,020 reported from the whole State in the census, estimates this year's crop at only 65 per cent. of last year's. In this county the stubble-crop is poor, while the acreage both in stubble and plant cane has been reduced. In some localities in Texas irrigation was used with good results in the culture of sugar-cane.

GEORGIA.—*Marion*: Sugar-cane good, but would have been better with a seasonable fall; no rain for ten weeks. *Liberty*: Injured by rain.

FLORIDA.—*Manatee*: Much injured by storm of October 6. *Jefferson*: Damaged 10 per cent. by late storms. *Leon*: Good, but suffered greatly by the gale of September 19. *Wakulla*: Materially damaged by the September gale. *Jackson*: Acreage increased; good as last year. *Crenshaw*: Grows well.

LOUISIANA.—*Assumption*: Greatly improved since last report. *East Baton Rouge*: Promising. *Lafourche*: Reports not encouraging. *Rapides*: Better than last year. *Saint Mary*: Stubble-cane a failure, yet the general average equals last year's.

TEXAS.—*San Saba*: Does well with irrigation. *Brazoria*: Stubble poor; acreage of both stubble and plant cane less than last year. *Titus*: Does well.

## BUCKWHEAT.

Rhode Island, Maryland, and all the cotton States, except North Carolina and Tennessee, return no buckwheat. The yield compared with last year was, in Vermont, 116; Virginia, 111; Tennessee, 110; Massachusetts, 108; New York, 106; Oregon, 105; New Jersey, 104; California, 102; Connecticut and North Carolina, 100; in the other States less than 100, the lowest being Nebraska, 40; Iowa, 53; Kansas, 56; Illinois, 57, Missouri, 61.

Trials of Silver-hull buckwheat distributed by the Department were for the most part quite successful. In York, Pennsylvania, 4 quarts yielded 5 bushels of good quality; in Virginia, Page, 2 quarts yielded 2 bushels; in Floyd, the seed yielded forty-fold; in Highland, it is reported as "our best variety; ripens earlier, and hence may be sown earlier, escaping early frosts and late hot sunshine." In Mercer, West Virginia, it also ripened earlier, and was better filled than the common variety. Further results of experiments with it will be found noted in the extracts which follow:

NEW YORK.—*Washington*: Less sown than usual; crop good. *Tioga*: A little extra. *Albany*: A fair crop. *Wyoming*: Large yield.

NEW JERSEY.—*Warren*: Good average crop; good thrashing weather.

PENNSYLVANIA.—*York*: Quality good. *Armstrong*: Extra good crop. *Lawrence*: Injured by early frosts. *Elk*: Increased acreage. *Northumberland*: Crop large and fine; no early frosts.

VIRGINIA.—*Warren*: Buckwheat very fine. *Spottsylvania*: Crop large. *Northumberland*: Promises to thrash out well. Silver-hull does not suit our climate. *Page*: Crop good. *Washington*: Amounts to nothing; 2 quarts of Silver-hull from the Department produced 2 bushels; ripened two weeks earlier than the common variety, and doubled its yield. *Highland*: Growth good, but much destroyed by squirrels, turkeys, &c., there being no mast in the woods. *Floyd*: Silver-hull a success; seed produces 40 fold. *Greenville*: Seed from the Department did not do well; needs acclimation.

NORTH CAROLINA.—*Stanley*: Taken by rats and rabbits.

SOUTH CAROLINA.—*Orangeburg*: Silver-skin a failure.

GEORGIA.—*Taylor*: Silver-hull from the Department very favorably reported.

TEXAS.—*Denton*: Buckwheat from the Department very fine considering the drought.

ARKANSAS.—*Arkansas*: Grew luxuriantly, but has no seed in the chaff. *Garland*: Gained 5 per cent. in quantity and 40 per cent. in quality.

WEST VIRGINIA.—*Grant*: Badly injured by frost. *Mercer*: Slightly over average; Silver-hull did well; matures a week earlier and is better filled than the Black-hull. *Fayette*: Three quarts Silver-hull produced  $1\frac{1}{2}$  bushels; the straw is objectionable. *Tyler*: Generally good.

OHIO.—*Vinton*: Crop would have been large but for early frosts. *Medina*: Reduced to half a crop by grasshoppers and early frosts. *Coshocton*: Above average; increased acreage. *Wood*: Almost a total failure.

MICHIGAN.—*Shiawassee*: Early sowings escaped damage, but the frost cut down the yield below average. *Berrien*: Shortened by drought.

INDIANA.—*Ripley*: Greatly damaged by frost.

ILLINOIS.—*Bureau*: Almost a failure. *Winnebago*: Not half a crop.

WISCONSIN.—*Green*: Almost a failure. *Adams*: Scalded in the blossom and did not fill; some fields not harvested. *Dodge*: Drought prevented the grain from filling; only 75 per cent. of an average. Silver-hull about the same as our native varieties. *Green Lake*: Injured by drought and early frost.

MINNESOTA.—*Isanti*: Silver-hull a great acquisition; cropped well and ripened early.

IOWA.—*Clarke*: Badly injured by summer drought. *Mills*: All frost-killed. *Hardin*: Frosted. *Tama*: Failure through drought and early frost. *Benton*: Mostly destroyed by frost. *Des Moines*: A total failure because of drought; silver-hull two weeks earlier than either the black or gray. *Jefferson*: Ruined by frost. *Wayne*: Almost a total failure through frost. *Louisa*: Ruined by drought; won't pay for harvesting. *Monona*: Increased acreage, but swept by grasshoppers. *Calhoun*: Killed by early frost. *Grundy*: Almost ruined by September frosts.

MISSOURI.—*Caldwell*: Entirely ruined by drought. *Clinton*: Destroyed by early frost. *Harrison*: Almost a failure through frost. *De Kalb*: Nearly a failure. *Howard*: Nearly destroyed by frost. *Mercer*: Silver-hull yielded 3 bushels very fine from 4 quarts



of seed. *Cass* : Almost a failure. *Laclede* : A fourth of a crop. *Pemiscot* : Silver-hull yielded well.

KANSAS.—*Nemaha* : Area largely increased, but very little has been harvested, and that of inferior quality ; silver-hull did best. *Howard* : Silver-hull from the Department failed through drought. *Shawnee* : Mostly killed by early frost. *Washington* : Killed by early frost. *Jefferson* : Nearly a failure through drought. *Labette* : Almost a failure from drought. *Woodson* : A total failure ; even the silver-hull, which last year yielded 50 per cent. more than the common seed, failed through drought. *Coffey* : Hardly half a crop. *Cowley* : Silver-hull not successful here. *Osage* : Ruined by drought and insects. *Smith* : A failure. *Cherokee* : Silver-hull destroyed by prairie-chickens.

OREGON.—*Grant* : Materially injured by early frosts.

DAKOTA.—*Clay* : A failure.

IDAHO.—*Bon Homme* : Killed by early frosts. *Nes Perce* : Silver-hull from Department did well though late sown.

## BEANS AND PEASE.

MAINE.—*Piscataquis* : Beans largely killed by frost August 25. *Androscoggin* : Beans good.

VERMONT.—*Franklin* : Decreased acreage, but the stock of merchantable beans is larger than last year. *Lamoille* : Beans raised on a larger scale than formerly by a few farmers.

NEW YORK.—*Tioga* : Beans and pease good. *Wyoming* : Beans a large yield.

VIRGINIA.—*Clarke* : Abundant and good.

NORTH CAROLINA.—*Chowan* : Pease a half crop. *Gaston* : Pea-crop unusually fair. *Greene* : Early frost cut the pea-crop short 25 per cent. *Haywood* : Beans very prolific. *Martin* : Pease a good crop.

SOUTH CAROLINA.—*Williamsburgh* : Pease a fine crop, but harvesting is costly, encroaching on the margin of profits. *Marlborough* : Pease nearly a failure.

GEORGIA.—*Jackson* : Beans and pease very good. *Whitfield* : Pea-crop large and sound.

TEXAS.—*Upsur* : Fine pea-crop, helping out the deficient corn-crop. *Cherokee* : Pea-crop fine.

ARKANSAS.—*Bradley* : Increased acreage. *Garland* : Pease cut short by drought, but equal to last year : beans yielded a surplus and sold well.

TENNESSEE.—*Blount* : Pease good.

WEST VIRGINIA.—*Mercer* : Beans and pease good.

OHIO.—*Washington* : Beans largely planted to meet the anticipated deficiency in potatoes. *Medina* : Beans extensively planted to make up an anticipated deficiency in potatoes, but grasshoppers and early frosts diminished the yield to an average.

MICHIGAN.—*Livingston* : Beans a good yield of good quality.

ILLINOIS.—*Knox* : Beans frosted.

WISCONSIN.—*Dodge* : Beans a good crop and well cured.

MINNESOTA.—*Steele* : Small crops, but fair.

IOWA.—*Monona* : Beans and pease planted in larger quantities than ever before, but destroyed by grasshoppers.

MISSOURI.—*Laclede* : Beans half crop.

NEBRASKA.—*Antelope* : Beans rusted badly : much eaten by grasshoppers.

OREGON.—*Grant* : Beans materially injured by frost.

UTAH.—*San Pete* : Beans light, but good ; pease not so abundant as last year, but of excellent quality.

IDAHO.—*Ada* : Beans injured by frosts.

DAKOTA.—*Bonhomme* : Beans injured by grasshoppers.

NEW MEXICO.—*Mora* : Better than last year, but below average. *Doña Ana* : Beans and pease injured by lack of water.

## TOBACCO.

The average in comparison with last year is 94. The returns for tobacco make the yield above that of 1872 in West Virginia, 129 ; Kansas, 114 ; Arkansas, 108 ; Virginia, 102 ; Illinois, 101 ; New Hampshire, New York, Texas, and Oregon, 100. The other States range between 70 in Pennsylvania and 98 in South Carolina and Florida. In condition, Connecticut reports an average of 133 ; Massachusetts, 120 ; New Hampshire, 118 ; Vermont, 110 ; Maryland, Louisiana, and Oregon, 106 ; Kansas, 102 ; Virginia, Georgia, and Alabama, 101. Other States range between 100 in Illinois and 91 in Missouri.

MASSACHUSETTS.—*Franklin* : Tobacco is doing well ; no pole-sweat ; scarcity of money prevent the early marketing of the crop.

CONNECTICUT.—*New Haven*: Excellent where not frosted.

PENNSYLVANIA.—*Lancaster*: Crop short.

MARYLAND.—*Howard*: Good season and good crop.

VIRGINIA.—*Madison*: Generally cut before frost, and curing handsomely. *Fluvanna*: Full crop, though much of it was late. *Pittsylvania*: Did not recover from July drought. *Rockbridge*: Failed; did not get a good stand. *Chesterfield*: Heavy yield, but badly frosted. *Buckingham*: Large crop well secured; fine harvest-season. *Mecklenburg*: Short crop planted and it failed to mature; much was cut green. *Spottsylvania*: Crop large; season fine; no frost until October 13. *Orange*: Crop had a bad start, but subsequent good weather made a fair yield. *Goochland*: More tobacco made than in any year since the war; quality good. *Cumberland*: Very fine. *Nelson*: Much had to be cut green to escape frost; curing season good. *Dinwiddie*: Scarcity of plants and increased cotton culture reduced the acreage; crop injured by rains.

NORTH CAROLINA.—*Person*: Yield heavy and good. *Alamance*: Poor stand at starting; grew rapidly later in the season, but produced but little fine tobacco; cut before ripening. *Forsyth*: Good and secured. *Rockingham*: Heavy, but inferior on account of late rains. *Caswell*: Planting delayed by drought; later rains caused a second growth, which did not mature well; fine tobacco scarce.

FLORIDA.—*Gadsden*: Large increase of Cuba tobacco.

ALABAMA.—*Crenshaw*: Acreage 25 per cent. increase; yield 25 per cent. above average. *Hancock*: Increased acreage and good quality; seed mostly brought from Havana.

TENNESSEE.—*Dickson*: Good crop well secured; injured somewhat by worms. *Obion*: Very good. *Williamson*: Acreage 25 per cent. less; quality 25 per cent. better. *Sumner*: Injured by frost in some places; increased acreage will make up the deficiency; *Smith*: Ten per cent. over last year's yield. *Trousdale*: Not so good leaf as last year. *Putnam*: Crop large, excellent, and well secured. *Robertson*: About 600 pounds per acre average; quality 25 per cent. below last year.

WEST VIRGINIA.—*Grant*: Badly frosted. *Mercer*: Very good; increase acreage; more attention to this crop.

KENTUCKY.—*Hardin*: Above average in quantity, but inferior in quality. *Oldham*: Secured in good order; shortened by drought. *Adair*: Larger acreage than ever before; late planted and somewhat frosted. *Laurel*: Above average in spite of frost. *Nicholas*: Drought injured late plantings; worms bad. *Pendleton*: Stand late and consequently ripened late, reducing the quality, though but little was frosted. *Taylor*: Crop greatly reduced by wet early season and subsequent drought. *Clinton*: Great increase in tobacco culture; aggregate yield five times as great as last year. *Henry*: Depreciated by early frosts; late planted on account of drought. *McLean*: Injured by extreme wet weather. *Anderson*: Average. *Livingston*: Well saved; not frosted.

OHIO.—*Medina*: Leaves somewhat eaten by grasshoppers, preventing their use as cigar-wrappers.

INDIANA.—*Dubois*: Shortened greatly by drought. *Ripley*: Somewhat frosted. *Brown*: Increased acreage; late planted; considerably frosted. *Edwards*: Good in spite of worms.

WISCONSIN.—*Clark*: Damaged by wet spring and early frosts. *Adams*: Injured by early frosts.

MISSOURI.—*Moniteau*: Badly frosted. *Clinton*: Increased acreage, but some of it injured by early frosts. *Howard*: Injured by frost. *Carroll*: Early planting fine; late, damaged by frost. *Franklin*: Much injured by worms. *Stone*: Full 25 per cent. above last year in yield, but nearly worthless, having taken a second growth. *Cass*: Frost caught most of the tobacco.

KANSAS.—*Labette*: Experimental crops promising.

CALIFORNIA.—*Alameda*: Not extensively grown, but under a new method of treatment it is thought to be equal to Havana.

OREGON.—*Tillamook*: Growth small, but quality excellent.

## FRUIT.

MAINE.—*Cumberland*: Short crop of apples, owing to freezing last winter, and to an extensive yield last year. *Sagadahoc*: Almost a failure; a hard blow in September took off half the apples left on the trees; pears very fair. *Androscoggin*: Grapes above average; apples a failure; pears light. *Piscataquis*: Apples a very small crop; largely blown off by the September gale.

NEW HAMPSHIRE.—*Carroll*: Cider \$10 per barrel. *Hillsborough*: Apples few; pears abundant; grapes a fair crop.

VERMONT.—*Caledonia*.—In the west of the county the crop is double last year's; in the central and eastern portions but half as great. *Franklin*: Apples better than expected; choice varieties scarce, but cider-apples plenty.

MASSACHUSETTS.—*Berkshire*: Grape-crop full; the valuable varieties have ripened

finely; the dryness of the soil has operated favorably: good cultivation has been repaid in the apple-crop; pears abundant and good. *Franklin*: Apples worth \$4 per barrel. *Norfolk*: Apples a fourth of a crop; pears a larger crop than for several years.

CONNECTICUT.—*Windham*: Apples very scarce; know of no orchard producing a tenth part of a crop; pear-crop never better.

NEW YORK.—*Tates*: Good yields of apples in some quarters; pears not well matured, though above average in quantity. *Seneca*: Apple-crop small; pear-crop large. *Tioga*: Grapes good, but short; apples ditto; pears good. *Erie*: Apples well harvested and closely sold up at \$1.50 to \$2 per barrel. *Columbia*: Apples scarce and poor. *Cattaraugus*: Apples frozen on the trees. *Albany*: Grapes and pears fine. *Ontario*: Fruits well ripened. *Wyoming*: Grapes ripened well; apples good, but short; pears plenty, it being the bearing season.

NEW JERSEY.—*Hudson*: Grapes injured by drought; apples, hardly a half crop; pears more abundant than usual, the late varieties being the best. *Gloucester*: Complaints that fruit does not keep well. *Warren*: Apples short.

PENNSYLVANIA.—*Bucks*: Apples a light crop, except a local variety, Smith's Cider, which has greatly enlarged the yield. *Jefferson*: Such apples as were not blown off are generally sound. *Armstrong*: Apples fell off badly, yielding a short winter supply. *Northampton*: Apples few; picked but 10 barrels where last year I got 133: trees badly winter-killed. *Cumberland*: Grapes, apples, and pears almost a failure. *Northumberland*: Apples about one-tenth of an average; pears three-fourths; trees secured to stand winter better than any other fruit; grapes, one-tenth average.

DELAWARE.—*Kent*: Grapes never finer.

MARYLAND.—*Dorchester*: Grape-culture reliable and profitable. *Baltimore*: Fruit not so abundant as last year; grapes did better than other kinds.

VIRGINIA.—*Warren*: Grape-crop fine; culture increasing. *Bland*: Apples killed by frost when in bloom. *Madison*: Apples good and abundant in the mountainous region of the county. *King and Queen*: Grapes, apples, and pears did not fulfill their early promise. *Pittsylvania*: Many pear-trees killed by blight. *Orange*: Apple crop fair, though drought caused many to fall. *Northumberland*: Apples frosted in April; some have secured second crops, in other cases the third set of blossoms have appeared. *Page*: Apples better than for three years. *Goochland*: Apples and pears good crops. *Accomac*: Our usual shipment of dried-peaches amounts to about \$150,000 per annum: this year but one-fourth of that amount. *Cumberland*: Grapes and peaches injured by excessive rains: apples hold their own. *King George*: Apples not abundant; pears scarce; grapes defective, the Catawba alone proving successful. *Highland*: Apple-crop slender. *Floyd*: Fruit a failure through spring frosts; cranberries grew spontaneously in some places at the rate of 5 barrels per acre. *Greenville*: Apple-crop small; matured too early. *Patrick*: Cranberries would do well. *Dinwiddie*: Apples injured by spring frosts; pears 5 per cent. better than last year.

NORTH CAROLINA.—*Person*: Half crop of inferior quality. *Chowan*: Grapes short; apples almost none. *Craven*: Fruit materially damaged by cold spring and excessive rains. *McDowell*: Apple-crop short. *Ashe*: Cranberry-crop better than usual in quantity and quality. *Martin*: Grapes a failure; apples short; native pears above average.

SOUTH CAROLINA.—*Lexington*: Fruit-crop generally a failure.

GEORGIA.—*Towns*: Apples and peaches almost entirely failed. *Marion*: Apples, grapes, and pears below average: ravaged by insects. *Whitfield*: Grapes a full average and fine; apples generally injured by curculio or some other insect. *Johnson*: Fruit prematurely shed.

FLORIDA.—*Manatee*: Orange-trees badly injured and 25 per cent. of the fruit fallen off. *Putnam*: Lemons average; olive does well.

MISSISSIPPI.—Blight very destructive to several varieties of pears, especially Le Curé, Belle Lnerative, Bartlett, &c.; apples short.

TEXAS.—*Hamilton*: Fruit of all kinds a failure, even the hardy Mustang grape. *Titus*: Apple and pear culture increasing. *Victoria*: Grape-crop small but excellent; pears a new crop, but of fine flavor. *Burnet*: All fruits frost killed in the spring.

ARKANSAS.—*Sebastian*: Fruit destroyed by late spring frosts. *Boone*: Fruit largely destroyed by spring frosts; Concord grapes did well, but no others.

TENNESSEE.—*Dickson*: Apples and pears destroyed by spring frosts. *Hickman*: Apples and peaches almost a total failure. *Grainger*: Poor fruit year. *Meigs*: Fruit almost an entire failure through late spring frosts. *Obion*: Almost a failure. *Wilson*: Grapes, apples, and pears damaged by spring frosts; almost a failure in low lands. *Blount*: Apples a failure; pears none. *De Kalb*: Fruit a failure. *Greene*: Apples a blank failure. *Marion*: All fruits killed by late frosts. *Putnam*: Grapes nearly all fell off. *Bradley*: Fruit almost a total failure.

WEST VIRGINIA.—*Mercer*: Winter apples very scarce. *Jefferson*: Apples fair. *Braxton*: Apples below average. *Monongalia*: Apples short and not keeping well. *Harrison*: Apples very defective; more than half worm-eaten; winter apples will not keep well.

KENTUCKY.—*Hardin*: Grapes a failure; apples a fourth of a crop and full of worms.



*Shelby*: Apples mostly fell from the trees. *Adair*: Apples and pears almost failures. *Marion*: Apples and peaches failed. *Nicholas*: Apples scarce. *Clinton*: Small crop of apples. *Henry*: Apples and pears almost failures. *McLean*: Fruit a failure. *Logan*: Apples and pears nearly failures. *Fayette*: Grapes rotted badly; apples mostly fell from the trees; winter apples in small supply. *Anderson*: Grapes badly rotted; apples and pears average. *Larue*: Fruit a failure. *Jackson*: Fruit nearly a total failure.

**OHIO.**—*Fulton*: Apples about average in quantity and quality. *Franklin*: Fruit-trees stripped in the spring by a black measuring-worm. *Medina*: Fruit a great failure. *Wood*: Largest yield and best quality of apples ever known; fruit smooth; sold at \$2.50 per barrel. *Lorain*: Grapes largely winter-killed; pears greatly blighted; trees in some cases stripped by grasshoppers. *Crawford*: Grapes and apples winter-killed; pears very poor; many pear-trees blighted. *Wyandot*: Apples fell off greatly; short crop. *Sandusky*: Apples better than for many years. *Lawrence*: Apples abundant and fine. *Hamilton*: One-fourth of the pear-trees destroyed by blight of last year. *Perry*: Some varieties ripened but little of their fruit; this attributed to the wet spring; apples very scarce; pear-trees generally well loaded with good fruit. *Mercer*: Pear culture growing in favor.

**MICHIGAN.**—*Mason*: Apples and pears never better; grapes not so plenty, but very fine. *Lapeer*: Grapes large yield of the best quality; apples excellent, but not so abundant; pears, a fair yield of the best quality. *Hillsdale*: Apple-crop worth \$100,000. *Calhoun*: Grapes a good crop, and ripened well where the vines had escaped injury. *Gratiot*: Huckleberries and cranberries abundant in the swamps and marshes. *Montcalm*: Many apple and pear trees dead and dying. *Oakland*: Apples scarce and inferior. *Antrim*: Apples and grapes abundant and good; pears extra nice, equal to California pears; a few peaches. *Berrien*: Grapes so abundant that only half the crop was saved; apple and pear crops heavy and good. *Livingston*: Apples few and wormy.

**INDIANA.**—*Owen*: Grapes badly winter-killed; remains of the crop closed out by hot, damp weather and insects. *Marion*: Fruit nearly all winter-killed. *Montgomery*: Fruit mostly a failure. *Gibson*: Apples badly rotted; peaches winter-killed. *Hamilton*: Fair crop of apples, but not of the best quality. *Morgan*: Fruit scarce, knotty, and wormy. *Dearborn*: Almost a total failure. *La Porte*: Grapevines largely winter-killed; apples and pears injured by drought and blight. *Floyd*: Apples a failure; grapes badly mildewed.

**ILLINOIS.**—*Kankakee*: Apple-trees badly winter-killed; lightest crop for years; quality fair. *Fayette*: Apples nearly a failure. *Madison*: Half crop of grapes; apples above last year. *Pike*: Grapes nearly all winter-killed except Concord, which yield a fair crop; apples scarce and poor. *Whiteside*: Apples and pears almost nothing. *Bureau*: Grapes half a crop, of good quality; apples a fourth of a crop, and generally small. *Perry*: Fruit mostly a failure. *Sangamon*: Fruit largely winter-killed. *Cumberland*: Grapes and apples mostly, and pears entirely failed. *Henry*: Apples mostly a failure. *Cass*: Fruit of all sorts almost a failure. *Edwards*: Apples almost none. *Grundy*: Fruit-trees badly winter-killed. *Hancock*: Fruit badly winter-killed and injured by storms. *Macon*: Some varieties of grapes good; apples a failure. *Boone*: Apples a light crop. *Clinton*: Apples not good. *Douglas*: Fruit almost a total failure; trees largely winter-killed.

**WISCONSIN.**—*Dodge*: Apples with many trees destroyed by May freeze. *Monroe*: Cranberries almost equal to last year, though injured by early frosts; this culture increasing. *Walworth*: Grapes short and of poor quality. *Green Lake*: Orchards terribly injured by the cold of last winter; blight fast destroying pear-trees. *Washington*: Some orchards did well, others poorly; very few pears; I gathered from trees from 16 to 24 bushels, each, snow-apples, Tolman's sweet, greenings, &c.

**MINNESOTA.**—*Steele*: Vines and trees injured greatly by last winter's cold. *Carver*: Grapes would have been average but for winter-killing.

**IOWA.**—*Decatur*: Less than half a crop; some orchards good, others no yield at all; pears badly blighted. *Harrison*: Grapes injured by grasshoppers. *Montgomery*: Grapes injured by drought. *Hardin*: Apples fell off badly. *Louisa*: Apple-crop small and inferior. *Guthrie*: Apples scarce and poor; worth \$2 per bushel.

**MISSOURI.**—*Caldwell*: Apples a short crop. *Platte*: Apples very poor. *Holt*: Fruit winter-killed; first failure of apples in thirteen years; south part of the county brought a fine crop. *Clay*: Apples and pears shortened by drought. *Texas*: Grapes half a crop, and rotted before ripening. *Montgomery*: Apples small and falling off before maturity. *Perry*: Grapes badly rotted. *Phelps*: Grapes badly mildewed and rotted; apples frosted on low lands. *Cass*: Very wormy apples; large pear-trees nearly all blighted. *Franklin*: Grapes, none; apples, very few. *Laclede*: No apples. *Newton*: No apples worth naming. *Cole*: Only hardy varieties like the Concord fruited.

**KANSAS.**—*Miami*: Concord grapes stung by some unknown insect; peaches winter-killed; apples short. *Leavenworth*: We had no apples worth counting. The State society took some premiums in the East, but it was a mere "trick of business." They solicited a few good specimens from young orchards in favorable localities and artfully

showed them up. In truth our apples are very knotty and poor, and not one-tenth of a product; not one-fourth of a supply for the people here. *Montgomery*: Grapes do well; very few bearing apple or pear trees; young orchards look well. *Riley*: Suffered from sun-scald: apples and pears nearly a failure.

NEBRASKA.—*Pawnee*: Fruit did not fill well on account of drought. *Nemaha*: Fruit-crops good. *Otoe*: Apples half average; pears a good average.

CALIFORNIA.—*Tuolumne*: Grapes nearly gathered; short, but good. *San Luis Obispo*: May frosts made great havoc with fruit-crops. *Contra Costa*: Vineyards greatly curtailed in production by the desiccating north winds.

OREGON.—*Grant*: Many young orchards just coming into bearing; a large annual increase in fruit products may be expected hereafter. Fruit does remarkably well, though late peaches were cut by early frosts. *Tillamook*: A few varieties of grapes; apples excellent, and crops enormous.

UTAH.—*Kane*: Fruits generally scarce, but good in quality, especially winter apples; best varieties, Rawle's Jannet, Spitzenburg, and Limber Twig. *Morgan*: Apple-trees have commenced bearing well, after being swept for five years by grasshoppers. *Iron*: Fruit destroyed by spring frosts. *Weber*: Fruit abundant and excellent; grape culture increasing; its success demonstrated. *San Pete*: Grapes a good yield, but of inferior quality; apples never so good; pears very good. *Salt Lake*: Apples almost a total failure; apple and pear trees much infested by worms; loss from the depreciation of these crops, \$200,000.

IDAHO.—*Ada*: Fruit injured by frosts; few orchards yet bearing.

NEW MEXICO.—*Doña Ana*: Fruit and grapes destroyed by frosts last April, a thing which never occurred before in this valley. *Thurston*: Good apple year; selling at 50 to 75 cents a box; pears always good; Seckel selling at \$1.25 per box.

Table showing the yield of the crops, &c., on the 1st day of November, 1873.

States.	CORN.		POTATOES. ( <i>Solanum tuberosum</i> .)		POTATOES. ( <i>Batataschulis sweet</i> .)		TOBACCO.		HAY.		BEANS.
	Product com- pared with last year.	Average qual- ity compared with last y'r.	Product com- pared with last year.	Average qual- ity compared with last y'r.	Product com- pared with last year.	Average qual- ity compared with last y'r.	Product com- pared with last year.	Average qual- ity compared with last y'r.	Product com- pared with last year.	Average qual- ity compared with last y'r.	
Maine.....	70		109						109		Product com- pared with last year.
New Hampshire.....	95		110						110		82
Vermont.....	91		125						114		122
Massachusetts.....	99		101						82		100
Rhode Island.....	101		106						82		101
Connecticut.....	90		116						96		98
New York.....	92		95						103		101
New Jersey.....	86		102						93		104
Pennsylvania.....	84		95						106		104
Delaware.....	90		100						98		100
Maryland.....	89		96						102		100
Virginia.....	106		106						100		100
North Carolina.....	88		92						116		98
South Carolina.....	87		104						102		104
Georgia.....	101		102						101		96
Florida.....	110		106						88		101
Alabama.....	95		125						101		97
Mississippi.....	85		116						111		103
Louisiana.....	99		99						106		100
Texas.....	75		92						123		100
Arkansas.....	90		103						105		98
Tennessee.....	91		92						102		108
West Virginia.....	101		99						160		120
Kentucky.....	96		93						122		107
Ohio.....	89		101						108		102
Michigan.....	83		95						115		106
Indiana.....	78		100						114		105
Illinois.....	61		80						96		101
Wisconsin.....	77		57						95		97
Minnesota.....	90		95						87		96
Iowa.....	72		83						94		98
Missouri.....	68		58						100		95
Kansas.....	79		73						90		103
Nebraska.....	60		46						105		84
Nebraska.....	60		78						102		83
California.....	98		69						93		108
Oregon.....	106		96						95		67
			103						115		90
			95						133		106

## States.

	PEAS.	BUCK- WHEAT.	FLAX.	COTTON.		SORGHUM.	SUGAR- CANE, (not sorghum.)	GRAPES.	APPLES.	PEARS.
	Product com- pared with last year.	Product com- pared with last year.	Product com- pared with last year.	Indicated pro- duct com- pared with last year.	Indicated pro- duct (11 in) per acre, in pounds.	Product com- pared with last year.	Indicated pro- duct com- pared with last year.	Product com- pared with an average crop.	Product com- pared with an average crop.	Product com- pared with an average crop.
Maine.....	91	85						90	45	70
New Hampshire.....	99	95						99	49	107
Vermont.....	102	116						99	72	103
Massachusetts.....	95	108						101	33	107
Rhode Island.....	100							114	33	97
Connecticut.....	96							104	31	103
New York.....	97	106	87					96	64	112
New Jersey.....	97	104						87	64	106
Pennsylvania.....	96	94	95					60	48	72
Delaware.....	75	85				75		115	50	100
Maryland.....		95						90	56	73
Virginia.....	101	111	96			95		94	79	88
North Carolina.....	97	100	98	98	159	92		71	47	67
South Carolina.....	115		98	92	184	91	90	62	43	53
Georgia.....	108			97	126	92	112	83	69	83
Florida.....				97			94	91		
Alabama.....	106			97	126	103	118	99	84	89
Mississippi.....	99			85	151	85	95	90	80	92
Louisiana.....	108			80	172	107	107	95	93	83
Texas.....	123			112	221	119	106	79	75	61
Arkansas.....	101			102	194	108		84	75	84
Tennessee.....	95	110	98	102	190	101	95	52	28	40
West Virginia.....	100	98	99			96		58	73	84
Kentucky.....	94	97	95			89		78	48	50
Ohio.....	100	88	82			85		54	51	72
Michigan.....	99	89				74		96	76	82
Indiana.....	96	84	84			79		59	52	57
Illinois.....	92	57				82		55	33	44
Wisconsin.....	98	66	106			55		63	63	64
Minnesota.....	90	82	111			90		74	67	
Iowa.....	90	53	188			75		70	48	64
Missouri.....	87	61	108			82		63	55	50
Kansas.....	77	56	160			89		68	53	65
Nebraska.....	72	40	63			78		90	76	91
California.....	98	102						78	87	
Oregon.....	96	105	100					86	155	147



## EXTRACTS FROM CORRESPONDENCE.

### ERRORS OF THE CENSUS.

*Blount, Ala.*—I am in receipt of the "Statistics of Agriculture," (census.) It is a work in which I feel much interest, and if full reliance could be placed in its accuracy it would be of much value. But, judging from those matters of which I have some personal knowledge, particularly in this county, I am constrained to infer that many of the returns are unworthy of credit. For instance, Table IV, page 95, shows 20,319 bushels of spring-wheat raised in this county in 1872. This is utterly untrue. I have lived in the county upward of twenty years, and if a single bushel of spring-wheat has been raised in it during all that time I have never heard of it. I am very anxious to get a sample of spring-wheat to experiment with, but know not where to obtain it. I think it would suit our climate. Fall or winter wheat, sown in the spring, sometimes does well here.

The value of "orchard products" (\$3,239) returned in the census must be far below the reality. In the number and size of farms given there are very grave errors; the unimproved land is, in the main, put down twice. In respect to wool, the low average clip per head in the Southern States may be accounted for in part from the fact that it is the custom to shear twice during the year, and the *spring clip alone* was on hand when the census was taken, and that was all that could be estimated as the product of that year. Hence only about half of the wool in the Southern States is embraced in the census returns for 1870. The sheep having been shorn in the fall of 1869, the spring clip of 1870 was necessarily short—not more than 50 or 55 per cent. of the wool product of the year.

### WOOL PRODUCT DECREASED BY SEMI-ANNUAL CLIPPING.

*Blount, Ala.*—The shearing of sheep twice a year diminishes the amount of wool, as I have satisfied myself by experiment. One fleece annually shorn in the spring will weigh more than both the fall and spring fleeces from the same sheep.

### ROOT CROPS FOR STOCK.

*Franklin, Vt.*—The cultivation of roots for stock is on the increase; crops very fine; mangolds better than turnips.

### WORN-OUT LAND RECLAIMED.

*Russell, Ky.*—In 1869 I purchased a farm on the Cumberland River. It had been cultivated in corn without rest for from fifty to seventy years, and was badly worn. It did not, in 1869, produce over 20 bushels per acre. A portion of it was not planted, as it was thought that it would not pay expenses of cultivation. A 35-acre field, one-half of which was not considered worth planting, I turned over, plowing 7 inches deep. In the spring sowed oats and clover; pastured my clover too close and had no sward to turn under. Last winter turned up 8 inches deep; in the spring cross-plowed with long bull-tongue, running 8 or 9 inches deep. Planted in corn 1st to 4th of May, 3 feet by 4; thinned to two stalks in the hill. Did not plow as often as I would have done, on account of the rains in June, but plowed three times, last plowing with bull-tongue, as deep as I could well do. As the result, I am now gathering from one-half the field 65 bushels per acre, from the other half have gathered something over 50 bushels. An adjoining farm of 200 acres, all in corn, has not raised as much as my 35 acres. So much for clover and deep plowing. I am confident that within a few years I can make my farm produce 75 to 80 bushels per acre, with no other fertilizer than clover and deep plowing, Break deep, and plow deep, and when your corn is young.

### CEREALS IN ARIZONA.

*Mohave, Ariz.*—Experiments have been tried in raising grain and sorghum with fair success. During 1874 a large acreage of grain will be grown, besides large vegetable gardens.

### LAND RECLAMATION.

*Contra Costa, Cal.*—The rapid progress made in reclaiming the overflowed, and in irrigating the hitherto considered barren lands, opens the most extensive field for profitable and varied culture to be engaged in under favorable conditions.



## AGRICULTURAL SPECIALTIES.

*Baltimore, Md.*—Dairying and gardening are our specialties; fine dairies near Baltimore, and along the railroads large quantities of milk are daily sent to that city; an improvement of cows is noticed; the business pays well.

*Orleans, Vt.*—The leading industry is dairying. In this town (Craftsbury) there are 600 cows; there are nineteen towns in the county, some of which have an equal or greater number. I estimate the total number at 9,000, averaging 150 pounds of butter per cow, and making a total product of 1,350,000 pounds. It sells at 30 to 35 cents per pound, but at an average of 25 cents it amounts to \$325,000, an aggregate greater than any of the crops except hay.

## GOOD AND BAD CROPS.

*Hancock, Ind.*—Last year the best crop year I have ever known in this county; this year the worst.

## COMMERCIAL FERTILIZERS.

*Laurens, S. C.*—Last spring the farmers bought vast quantities of guano, expecting to pay for it by the 1st of November with cotton at 17 and 18 cents per pound, but as cotton only commands 12 cents they feel much discouraged. It is generally believed that the most of this guano is swamp muck or alluvial soil.

*Lunenburg, Va.*—Nearly all depend on manufactured fertilizers. These are applied mostly to the tobacco crop, to be followed by wheat, and then by corn or oats, and then one or two seasons uncropped. The amount of money going out of the county, from the best information I can get, will nearly or quite equal the profits of the crops. Could the money be expended in labor, in the feeding and care of cattle and sheep, and the making of stable and yard manures, it would largely increase the productiveness of the lands.

## IMMIGRATION OF FARMERS.

*Baxter, Ark.*—This county is filling up with northern farmers, who are quite welcome; they are good farmers, and seem to be well pleased with the country.

## EPIZOOTY.

*Boone, Ill.*—Epizooty not so general as last year, but more serious. Discharge from the nostrils more copious; head, glands, &c., severely swollen.

## CATILE FATALLY DISEASED.

*Jefferson, W. Va.*—Two or three cattle died from what is called "mad itch," caused, as is supposed, by eating corn-stalks that had been chewed by hogs.

## RAISING SHEEP AND LAMBS.

*Orange, Va.*—Much attention has of late been paid to sheep husbandry, more with a view to raising lambs than wool. Very many common sheep have been introduced recently and bred to fine bucks.

## EARLY WINTER FEEDING.

*Tazewell, Ill.*—Farmers beginning to feed cattle earlier than for thirty years.

## SCARCITY OF MONEY.

*Miami, Kans.*—No money in circulation; the county verging upon bankruptcy; from 500 to 700 farms mortgaged at high rates of interest, (20 per cent. ;) farmers generally despondent.

## BAD SEASON FOR RICE.

*Georgetown, S. C.*—The season has been most disastrous to our specialty, rice. The heavy rains of August and September were so slow to run off that the swollen rivers delayed harvest four weeks. Rice cut and stacked in the field was almost a total loss. That uncut became over-ripe and tangled so as to cause great waste in harvesting. The loss will be 40 or 50 per cent., while the quality will be poor.

## GOOD CROP OF RICE.

*Clinch, Ala.*—Rice-crop very good; average yield of uplands 20 bushels per acre.

## CUBA TOBACCO.

*Gadsden, Fla.*—Prior to the war the Cuba tobacco was cultivated as a staple market crop, the annual product of the county amounting to about 4,000 boxes of 400 pounds

each, and commanding at the barns prices ranging from 20 to 80 cents per pound, according to quality. This is emphatically the "poor man's crop;" in numerous instances it has so proved itself requiring but a small acreage and little money. Every child six years old may be profitably employed on this crop, which is subject to none of the casualties of cotton. It will probably resume its former position of a staple crop.

#### DRY SEASON.

*Hancock, Me.*—The season from planting to harvesting has been one of as little rain as ever was known; many wells have been dry for months that were never dry before.

#### UNHEALTHY WEATHER.

*Alamance, N. C.*—Chills prevailing more than any year since 1846, owing to excessive wet and rank vegetation.

#### LARGE NUT CROP.

*Braxton, W. Va.*—Hogs getting fat on acorns. A very large crop of chestnuts, which the merchants are buying and shipping largely.

*Fayette, W. Va.*—Immense mast this year, and hogs make good pork on it without any corn. Millions of pigeons, however, are devouring it.

#### EARLY SNOW.

*Schoharie, N. Y.*—Snow on the highlands 12 to 15 inches deep on October 7; the rest of the month fine weather.

*Steuben, N. Y.*—Cold rain and snow October 19; ice October 22.

*Erie, N. Y.*—Snow 3 inches deep October 29.

*Lewis, N. Y.*—October 31 one inch of snow; soon disappeared.

*Cattaraugus, N. Y.*—Snow 3 or 4 inches deep October 20; snowing very fast to-day, November 1.

*Lawrence, Pa.*—Considerable snow October 27, 28, and 29.

*Campbell, Tenn.*—Cumberland Mountains covered with snow October 28.

*Kanawha, W. Va.*—Frost September 15; snow over 3 inches October 21.

*Randolph, W. Va.*—Great snow-storm, commencing October 19; snow fell from 24 to 30 inches deep and passed off without frost; considerable damage to fruit-trees and other timber.

*Ottawa, Ohio.*—Snow 5 inches deep October 21, with ice a quarter inch thick in shallow water.

*Vinton, Ohio.*—Snow 7 inches (the heaviest ever known at this season) October 21; two-thirds of it melted as it fell.

*Jackson, Ohio.*—Snowed 8 inches October 21.

*Coshocton, Ohio.*—Snowed 6 inches October 21.

*Highland, Ohio.*—Nearly a foot of snow October 21.

*Holmes, Ohio.*—Snow from 6 to 10 inches October 12. The timber, being full of green leaves, was badly broken down.

*Ottawa Mich.*—Frosts from September 20 to November 1 almost every night. First snow October 2, lasting six days; November 1 about 6 inches on the ground.

*Livingston, Mich.*—Ten inches snow.

*Clark, Wis.*—Snow October 24, 10 inches deep.

*Dunn, Wis.*—Eight inches snow October 25; sleighs used the last few days about as much as wagons.

*Outagamie, Wis.*—Snow-storm October 25; 12 inches on the ground.

#### EXPERIMENTS IN TREE-CULTURE.

*Sedgwick, Kans.*—Chestnuts, hickory-nuts, and acorns summer-killed the first season I intend to plant under other trees for shade. If that will not do, we must give up raising hard timber. Soft timber does well.

#### SUCCESS WITH CASTOR-BEANS.

*Wilson, Kans.*—Many farmers planted castor-beans last spring, and though the season has been very unfavorable the returns have been far greater than from corn, or, in fact, from almost any other crop grown here.

#### SUCCESS IN MANUFACTURING BEET-SUGAR.

*Alameda, Cal.*—The Alvarado Beet-sugar Manufactory, in this county, is making a fine article of sugar, and is worked up to its full capacity, with ready sale for its products.

#### PRODUCTION OF HEMP.

*Mercer, Ky.*—Hemp raised to a considerable extent; our best land will yield 1,000 pounds per acre. It is our best crop when prices will justify it, say from \$5 to \$3 per 112 pounds. It cannot be raised for less money. Only our best land will grow it. For the last year prices have been so low, and the expense of handling so great, that there has been no profit in it.

# IMPORTANCE OF A JUDICIOUS SELECTION OF SEED.

BY THE COMMISSIONER OF AGRICULTURE.

Through the medium of an essay read before the Agricultural and Mechanical Association of Gadsden County, Fla., by the Hon. C. H. Dupont, I desire to impress upon the farmers and planters of the country the great importance of a proper selection of seed. The essay is given in a plainness of language and with a force of expression which must command the assent of every reader, and perhaps induce the practice of what is so sensibly enforced. The planter is apt to conclude that selection gives too much trouble; but that trouble is the work of the farm, and what work can be so profitable? But there is another injunction which should accompany the precepts of this valuable essay: that crops of grain, cotton, or tobacco must be rotated by grass, peas, rye, or other vegetable crop turned into the ground. It is one of the provisions of nature, that the growing product of the soil itself is essential to its continued life and powers of reproduction. While artificial manures and mercantile stimulants may force production for a time, their ultimate consequence, without the addition of growing vegetation, is debility and death.

The following is Mr. Dupont's essay:

It is a law of physical nature, as universally applicable to the vegetable as to the animal kingdom, that "like produces like." The recognition of the law is not merely theoretical or speculative; it is of universal acceptance, and its existence has been attested by long experience and the most critical observation. The judicious stock-raiser gives his testimony as to his belief in its existence when he consents to pay fabulous prices for what he denominates "pure blood," whether it be of horses, cattle, sheep, or swine. So universal is this belief among mankind, that he would be set down as a fool or a madman who should essay to rear a first-class racer or trotter from anything short of a "thorough-bred" on the side of both sire and dam.

It may, however, be asked, if this be a *law*—fixed, absolute, and universal—how happens it that differences in color, form, power of endurance, and fleetness almost invariably exist between the individual produce of the same sire and dam; and this query may be propounded as an argument to establish an *exception*, which is contrary to the essential quality of a "*law*," the idea and definition of the same being fixedness and universality. But the querist gains no aid to his doubt when he is informed that there is another law governing the procreation of all animals, which is denominated "breeding back." It is established beyond all cavil, by the experience of the most critical observers, that where there exists the slightest *taint* of blood in the original stock, although it may have lain dormant for several generations, yet in the course of time it will be apt to show itself in some individual of the family. This is particularly observable in the breeding of that noblest of the lower animals, the horse, and if credit is to be accorded to the statements of some of the most reliable medical authors, even man himself is not exempt from the operation of this latter law. Well-attested cases are cited, where the *taint* of African blood, after laying dormant for two or three generations, has at last exhibited itself in some member of the family by a marked development of all the physical characteristics of that particular race. A little reflection will lead to the conclusion that these differences in the progeny, so far from impinging on the law as laid down, only add strength to the announcement of its universal existence.

But these differences may arise from causes other than a taint of blood in the original stock. It is a plausible supposition that in the matter of *color*, this may be greatly influenced by the imagination at the instant of procreation; as to the other differences named, they are beyond the scrutiny of human observation. Much doubtless is dependent on the condition of the parents in point of bodily health and vigor, and not a little on the after rearing of the progeny. That differences in the qualities of the progeny of the same parents do exist is undeniable, but that these differences constitute *exceptions*, which so weaken the rule as to deprive it of the essential qualities of a *law*, is not admitted. Hence, then, the very great care observed by the raisers of blooded



stock, to *select* as breeders from particular parents those of their progeny which show the finest points of excellence and the closest resemblance to the original stock. It is only by such judicious *selection* that the blood can be kept at its original standard of purity; any neglect in this matter would inevitably result in a speedy degeneration.

Reverting to the premise laid down in the beginning, we re-assert that the physical law previously announced is as applicable to the vegetable as to the animal kingdom. If this be true, how very important is it that the agriculturist, upon whom exclusively the population of the earth is dependent for an adequate supply of food and raiment, should give the utmost care and attention to a judicious *selection* of the seeds from which his crops are to be realized. And yet, in our highly favored South, favored beyond any other land in the fertility of her soil, the geniality of her climate, and the equability of her seasons, how criminally neglectful are our farmers and planters in regard to this very important point. To illustrate the extent of this neglect, it is only necessary to advert to the programme observed on the great majority of our farms and plantations. In this review I shall confine myself to cotton and corn, the two great staples of Southern industry.

In the matter of cotton, the chief anxiety of the planter is to save the present, with no reference to the production of future crops. The cotton is picked from the boll as expeditiously as possible, often even without reference to the state of the weather, and thrown indiscriminately into one pile in the gin-house, there to remain until it may be convenient to start the gin. In this pile there is a general commingling and mixture of the bottom, middle, and top crops—the good and bad, the matured and the immature—and from this conglomeration of different qualities is obtained the seed for the planting of the next crop. It is true, that some planters are to be found who have advanced so far in the science of *selection* as to be careful to set apart the picking from the middle crop, (or at least to *give orders* to their agents to that effect,) the seed from which is exclusively used for planting. But even in such cases, in these days of dilapidated gin-houses, demolished scaffolds, and general scarcity and unreliability of agricultural labor, much of the seed of this middle picking is injured by the heating of the cotton in the pile, which invariably generates incipient decay, and to this cause, more than to any other, may be attributed the great prevalence of “bad stands” since the close of the late sectional war.

But supposing that we have discovered in our midst a careful, pains-taking farmer or planter, who does not rely upon the *issuing of orders*, but gives the matter his closest personal attention. He has kept the different pickings separated and apart; designating the best matured and least faulty for seed; he has had it perfectly dried before it is piled in the gin-house; he has had it carefully ginned and the seed set apart, to be used in the planting of the succeeding crop. With all this very commendable care and painstaking on his part, he has nevertheless made only one move in the right direction, and, if he stops there, he may justly be compared to the rickety child who, having accomplished his first step, toddles along through life without ever arriving at the firm, sturdy, and elastic walk of vigorous manhood.

Upon invitation we accompany this exceptional farmer to his well-tilled cotton-field. In our ramble through the luxuriant growth, our attention is arrested by a stock of magnificent proportion and the most perfect symmetry, and literally loaded and bending under the weight of well-formed bolls, in all stages of maturity. This stock is not above medium height, but is of rather bulky proportions. Near the ground it reaches out two long arms, and each of these throws out numerous limbs, which are closely studded with fruit. From the main body or center stock also proceed numerous limbs, gradually diminishing in length as they approach the apex of the plant, so as to form almost a perfect pyramid. These limbs are short-jointed, and to each joint is attached a large and finely developed boll. Upon closer examination we discover no indication of a loss of fruit; the forms have “stuck.” Our well-pleased friend views this splendid representative of the royal family of “Old King Cotton” with evident pride and exultation, and, if the truth were known, has doubtless already fixed it in his mind to make exhibition of it at some prospective agricultural fair.

Near by our attention is arrested by a stock of equal proportion and of even greater luxuriance. The same out-reaching arms characterize this stock, and the limbs from the center stock are somewhat longer and equally well jointed. There are conclusive indications that this stock had been prolific in “*forms*,” but alas! there are only a few matured bolls to be seen; the early promise of fruit has been blasted by premature “shedding.”

In the immediate vicinity of these two representatives of the royal family looms up one of tall and graceful mien; no long arms nor bulkiness despoils it of its majestic air, but trim and lithe in form, it attitudinizes in the passing breeze the “Grecian bend,” as gracefully as any well-laced “dandy” in tights. But that is not its only point of resemblance, for upon examining for *fruit* it is to be found woefully deficient and can be classed only as “a cumberer of the ground.”

Now these three representatives are faithful types of our friend's entire crop, and his attention being called to the marked differences in *fruitfulness* and the cause inquired for, he very flippantly assigns some essential difference in the elements contained in

the soil in which they were severally grown, and, acting upon that hypothesis, he proceeds to take from the root of each plant a sample of the soil, and forthwith posts it off to the agricultural chemist to be analyzed and reported upon. In due time the report comes back that the analysis has detected no essential difference in the respective samples. (Perhaps if the learned professor had been informed of the *purpose* of the required analysis, he might have been able to have detected a difference, which in fact had no existence.) Our friend being a sensible man, for the first time recognizes the fact that as in the animal so in the vegetable kingdom, there exist different types of the same species, and that for the purpose of propagation a *judicious selection* is as essential in the one case as in the other. Acting upon that conviction he promptly determines to turn over a new leaf in his farming programme, and instead of obtaining seed from the general pile, which has been picked without any discrimination, he marches to the field at the commencement of the picking season, and having previously determined by close observation the *type* to be preferred, he proceeds to pick only such bolls as are fully developed and well matured. To render his work in this new programme perfectly thorough, he uses great discrimination and selects very closely, so that at the termination of the picking season he finds that he has gathered only one hundred pounds of cotton from a field of perhaps one hundred acres. But he is not discouraged by the smallness of his accumulation; he knows that this hundred pounds will yield him two bushels of seed, which will plant a patch of two acres at least; and his experience has taught him the extraordinary progressive increase of all seed plants. He is therefore satisfied with the result, remembering that it is only the *beginning* of a good work.

But just here our farmer friend, advertent to the fact that all the phenomena occurring in the rearing of animals also occur in the rearing of plants, justly concludes that to preserve his seed from degeneration, and to keep it up to its original standard of excellence, it will be necessary to give to the parent stock an ample supply of nutritious food, so as to keep it in good condition and impart to it that healthful vigor so essential to successful propagation. To accomplish that end he resolves to establish a *permanent* "seed-patch," and forthwith commences the collection and application of fertilizers, domestic, (and, if need be, commercial,) until he brings it up to the production of two bales of lint to the acre. In this patch, located somewhat remote from the balance of the crop if practicable, he deposits his two bushels of selected seed, chops it out into bunches of three or four in a place as soon as the plants have put forth the third leaf, carefully avoiding the bruising of the plants left; and when it has put forth its fourth and fifth leaves, thins it out by hand to a stand of one in the hill, taking care to leave those stocks which exhibit the most vigor and greatest tendency to bulkiness of form. The after cultivation is thorough and judiciously applied, the plants advance rapidly to maturity, and about the 1st of July it is *topped* to insure development and maturity to the upper bolls. From these two acres our farmer finds himself the possessor of four bales of lint, and at least one hundred and twenty bushels of selected seed, to be used in the planting of the ensuing crop.

But his work does not end with the first year's selection, for he has discovered the presence of *intruders* in this his agricultural *sanctum*. The burly but fruitless gentleman and the attitudinizing dandy before referred to have again put in an appearance and they must be gotten rid of. He therefore enters upon another selection from his "seed-patch," and repeats it from year to year, until he has effectually *fixed the type* of the original stock, and his heart is gladdened each revolving year by the evidence that his labor has not been uselessly expended in the cultivation of barren interlopers, but that each plant generously responds to his efforts, as a prolific fruit-bearer, and amply repays him for his toil and patient painstaking. The "seed-patch" and "annual selection" become *permanent* institutions in his agricultural programme, to be handed down to his posterity as an inheritance more valuable than evanescent gold. This is the programme of a plain, practical agriculturalist, who is not afraid of the ridicule of being denominated a mere "theorist," or "new-light progressionist," and it is urgently commended to the earnest consideration and adoption of every member of this association.

Having consumed so much time and space on the subject of cotton, I am admonished of the propriety of being as brief as possible on the other branch of the subject—corn. Indeed, it might suffice to say that all the principles announced in regard to the successful growing of cotton hold equally true in regard to the production of this much more important staple. I desire to emphasize the words "much more important," in the face of those who hold the doctrine that it is more remunerative to apply our entire labor to the production of cotton and rely upon the teeming granaries of the West for a supply of that indispensable article. A moment's reflection will show the fallacy of that doctrine, the prevalence of which, to only a moderate extent, has already largely contributed to the existing depression throughout the entire cotton belt. This doctrine is now acted upon to only a limited extent, but should it ever obtain universal acceptance the consequence would be the production of a large *surplus* of cotton at the expense of an entire destitution of corn, thus depressing the price of the former and correspondingly enhancing the price of the latter. How such a result could bene-



fit the grower of cotton is beyond the comprehension of any sane mind; it would be practically the making of *cheap* cotton to buy *dear* corn! Any reform, then, that shall contribute to increase the domestic supply of corn must result in incalculable benefit to the entire population of the South. The inauguration of such reform may be found in a judicious "selection of seed."

To demonstrate the necessity for a reform in this particular it is only necessary to advert to the manner in which the seed-corn is usually obtained. In the fall of the year the crop is indiscriminately gathered and hauled to the crib, and there all, good, bad, and indifferent, is thrown into one pile. It there lies until spring; and a few days prior to the day designated for the commencement of planting, (and more frequently on the morning of that day,) the "hands" are ordered to the crib to *select* "seed-corn." They commence the work, and the first dozen ears that are shucked are found to be "weevil-eaten," and are rejected. The next dozen are found to have the "black-eye," and are also rejected; until at last some one of the "hands" comes across a little "nubbin" which is pronounced *sound*, and that is thrown aside for "seed." Thus the work proceeds until a sufficient quantity for planting the crop has been obtained. The seed has been *selected*, but the only quality deemed essential was *soundness*; the long-grained "gourd-seed," the broad "Tuscarora," the round "flint," without any discrimination, are brought into close juxtaposition. In due time, under the influence of a favorable season, the heart of the farmer is gladdened by the sight of a *good stand*. He goes to work zealously, and by unremitted toil gives his crop the advantage of good tillage until it is brought to full maturity. In the ensuing fall he proceeds to gather the fruit of his labor, and is greatly *disappointed* to find that the yield has not come up to his anticipation, but, with philosophic composure, he consoles himself by attributing the failure to the unsuitableness of the climate, and reiterates the oft-repeated but unfounded assertion that "this is no country for growing corn."

Let not our industrious but mistaken friend be discouraged that Providence has cast his lot in this southern clime, so favorable to the enjoyment of health and long life, and so prolific in the production of the kindly fruits of the earth. Let him for one moment pause and reflect. Let him scan the authentic statistics furnished by the Agricultural Department at Washington, and he will there discover that New England, with her granite hills and three inches of cultivable soil, her cold and rigorous climate, and her short and uncertain seasons—in despite of all these disadvantages—reports a higher *average* in the production of corn than does the far-famed West, the recognized Egypt of this continent, and indeed of the world. It is not any defect in soil or climate that causes him from year to year to reap the bitter fruit of disappointment; it is the absence of that patient painstaking which so eminently characterizes the agricultural operations of the New England farmer. Let our southern farmer and planter emulate this commendable characteristic of the eastern agriculturist. Let him now, this very season, resolve to turn over a new leaf, and, as a first step in the proposed reform, determine to carry into practical effect the recommendations heretofore urged for the improvement of the cotton-seed. This can be done with but little extra trouble by requiring of the hands, in breaking-in the crop, to be careful whenever they come across a stock bearing more than a single ear to cut it off above and below the ears, and, with the ears attached thereto, throw it into the heaps, to be hauled with the same to the crib, where it can be readily separated and kept apart by itself until such time as it may be convenient for the farmer to make the proper selection. Having by this method secured the essential quality of "prolificness," he proceeds to select from this pile a sufficient number of such ears as are recommended by their superior size and excellence of grain, it being a matter of first importance to select a grain that will most effectually resist the attacks of the weevil. These should be put into barrels and the interstices between the ears well filled up with perfectly dry sand or wood-ashes. Thus treated it will be exempt from the inroads of insects and preserved in good condition until the season for planting. In making this selection *uniformity* in the character of the grain ought not to be neglected.

But let not our farmer who has entered upon the path of reformation be content with the result of a *single* experiment. Let him remember that the purpose of selection is not for the benefit of a single crop, but to impart the quality of "fixedness" to a particular "type," and to resist the natural tendency to degeneration. To attain this desirable result he must, as in the case of cotton, make the "seed-patch" a *permanent institution*, from which he may from year to year not only obtain an abundant supply of improved seed for the planting of the entire crop, but be enabled to improve his selections to the very highest point of excellence. When we reflect how small a quantity of corn is required to seed a large area of land, is it not passing strange that this vitally important subject should be so universally neglected? Let this opprobrium no longer rest upon the farmers and planters of Gadsden County, but let them rise to a full appreciation of the needed reform, and then we may hope that ere long dear "old Gadsden," now struggling with the difficulties that environ and oppress her, shall rise like the phoenix from its ashes, and become as noted for the fullness and abundance of her corn-crops as she has heretofore been for the excellence of her Cuba tobacco. Henceforth let *Excelsior* be the agricultural motto of this association.



## AGRICULTURE IN THE OLD WORLD.

The following condensed exhibit of a few salient points in foreign agricultural statistics, accompanied with indications of prevailing agricultural tendencies at the present time, prepared by the Statistician of this Department, was read before the New York Rural Club, and is given in connection with more extended statistics of European agriculture, to be printed in this and succeeding numbers of the Monthly Report:

It would be presumption in me, after a hasty glance at the fields and vineyards of a few of the countries of Europe, to attempt a portrayal of even the prominent features of European agriculture. I will only indicate briefly the leading impressions received, supported by a few illustrative facts. Nor do I care to indulge in the egotism of personal adventure, or details of rural description, preferring, as the theme is so broad and the time so short, to epitomize a few of the dominating facts which illustrate the variety, the extent, and the prevailing tendency of rural production, even at the risk of heaviness from the gravity of a freightage of statistics.

As no true American comes in contact with the civilization, the institutions, the politics of Europe, without brightening his patriotism and intensifying his appreciation of home capabilities and attainments, so a view of European agriculture, ripe with the fruitage of time and effort, though almost everywhere displaying parasitic and injurious growth of the fungus of feudalism, only brings into favorable contrast our own agriculture, superior already in the fitness of its mechanism, and in the intelligence of its labor, as in the fertility of its lands, and in the range of its production. While so much may be said of the present, it belongs to the future to refine what is crude, to systematize what is chaotic, to perfect what is primitive. A statistical glance at the conditions and results of agricultural labor in several nationalities will render more intelligent an attempt to compare the status of agriculture of one country with that of another or our own.

*Great Britain.*—England, Scotland, and Wales, known together as Great Britain, a manufacturing and commercial country, in which but six per cent. of the population are actually employed in agriculture, furnish an example of the cleanest culture, the most rational processes, the most extensive use of money in permanent improvements and in fertilization, and the highest rate of production known to the industry of Europe and of the world. In some of these respects Holland is only exceeded slightly, if at all. While the land is held too tightly in the clutches of the dead and of the titled living, it is gratifying to see that the people are wresting to their own use even the smallest parcels of it. While, according to the official enumeration of 1870, only 46 per cent. of the "holdings" or farms exceed 20 acres each, they occupied 91 per cent. of the total area returned; 28 per cent occupied 20 to 100 acres each, and 18 per cent. above 100 acres each. In 1871 the area cultivated in holdings from one-fourth of an acre to 20 acres was but 1,897,000 acres, out of 30,838,000, or six per cent.; but they carried 11 per cent. of the cattle of the country, and 25 per cent. of the swine. It was found in 1872 that there were 60,944 holdings of one-fourth of an acre to an acre in extent, of which 67,422 were in England, and of that number 49,000 were allotments held by agricultural laborers and workmen. This practice of allotting land for the use of laborers is making rapid increase.

The total area of Great Britain is 56,964,260 acres, of which England comprises 32,590,397—the whole scarcely equal to the area of two of our Western States of average size. The population to be supported, 26,000,000, is one to rather more than two acres; in England, one to 1½ acres; and yet little more than half of the total area, 31,000,000 of acres, is in cultivation, nearly 24,000,000 of which is in England proper. A key to agricultural prosperity is found in the fact that not exceeding one-third of the occupied area is allotted to exhaustive crops, as the cereals; while two-thirds are given to restorative crops, as roots, clover, and grasses in rotation, and permanent pasture. The proportions last season were, for the whole country, 30.9 per cent. in grain crops, 11.6 in green crops, 14.5 in clover and grasses, and 40.6 in permanent pasture.

The production of meat is the first object of British agriculture; the growing of wheat is the consideration of next importance. Both cattle and sheep are well known to excel all others in meat production, attaining greater weight in a given time than continental animals. The official average of net weight of carcasses of British cattle of all ages is 600 pounds; of cattle imported, 500 pounds; of British sheep and lambs, 60 pounds; of imported, 50 pounds. The present tendency is to the increase of live

stock and the diminution of the live grain area. There has been a decrease since 1850 in the breadth of wheat, oats, peas, and beans, and an increase in barley, roots, clover, and permanent pasture; the reduction in "white crops," which now average 7,500,000 acres, exceeds 1,250,000 acres; wheat now occupying a little more than 3,000,000, or about one-sixth of our wheat area, although the product sometimes exceeds one-third of ours. The decrease has been about 10 per cent. in 29 years, not in product, but in acreage, the yield having increased  $1\frac{1}{2}$  bushels, and 5 bushels in one hundred years, being now 28 bushels, the largest national average. The supremacy of turnips has therefore not weakened in the least, and the importance of sheep, which suffered some decline during the area of low prices for wool in 1867, is now steadily advancing. There are now about 28,000,000 sheep to 30,000,000 acres of productive area. It was recently assumed, on good grounds, that one-fourth of the cattle were annually sold, at the rate of £16 each in England, £14 in Scotland, and £10 in Ireland; that one-third of the English sheep and one-fourth of the Scottish are annually sold at about 35 shillings each. The tendency has since been to still higher prices. Not only is the proportion of stock large, both to area and population, but the extra size of animals and extra feeding contribute both quantity and quality to home resources of fertilization, and afford a valid reason for enlarged production.

*Holland.*—Holland, not including the Zuyder Zee, has an area of 3,287,486 hectares, or 8,123,696 acres; with it, 3,818,529 hectares. It has a population of 3,500,000, constantly becoming denser, having increased 8 per cent. in ten years. Of this number 218,115 men and 35,730 women are actively employed in agriculture. Nearly four-tenths of this area is occupied in pasture and fodder production, showing the prominence of meat, butter, and cheese in the farm economy of the country. The tilled area is about 25 per cent. of the total. The cereal production last reported was about 9,000,000 bushels of oats, nearly as much of rye, and 4,500,000 bushels of wheat. The cattle are the best meat-producers of continental Europe, and in the flocks runs the best blood of English mutton breeds. In all the operations of the dairy, and of the farm as well, the extreme of neatness is the rule. The soil itself, originally a waste of sand, has been reclaimed by patient labor, a part of it literally from the domain of Neptune, and kept in generous productiveness by a liberal application of fertilizers; and now it is proposed to drain the Zuyder Zee, an area of 1,250,000 acres, and transform its bed into fruitful fields, at an expense almost equal to the cost of construction of our completed Pacific railroad line.

*Belgium.*—The area of this country is equivalent to 7,278,640 acres, of which 6,582,400 are productive, less than 10 per cent. being uncultivated. The population averages 448 to the square mile. The latest principles and processes of culture have been adopted, and agricultural implements and machinery are extensively employed, by co-operation and hire, when too expensive for individual ownership; and the prevalent economy of resources of fertilization is suggestive of Chinese practice, being seen not only in the protection from rain and sunshine of animal manures, but in sweeping up the droppings upon the highways, the collection and pulverizing of the bones of dead animals, and gathering of mud from rivers and canals, and the sewage of towns, while all these and other resources are supplemented by the importation of fertilizers; and thus is this diminutive kingdom, little larger than the State of Massachusetts, made to yield, of cereal grains, not less than 66,000,000 bushels, of which nearly 15,000,000 are wheat, 18,000,000 rye, and 24,000,000 oats. While more than one-tenth of the producing surface is allotted to wheat, (700,660 acres,) and fully as much more to rye, the crop next in extent is hay, followed respectively by oats, green fodder, potatoes, and pasture. I deduce from official statements that 540,025 acres of hay yielded an average of 1.82 tons per acre, and 432,931 acres in green fodder produced 8.8 tons per acre, and an aggregate of nearly 4,000,000 tons. The breadth of sugar-beets reported is equal to 45,644 acres, and the yield  $13\frac{1}{2}$  tons per acre, which is the same rate of production estimated for 70,641 acres of roots for fodder. There are also smaller breadths of spelt, barley, buckwheat, beans, peas, and vetches, and such commercial crops as flax, hemp, colza, hops, tobacco, chicory, and teasels. In the region known as the Polders, the reclaimed lands protected by dikes, a yield of 32 bushels of wheat per acre is obtained, and yet there is never produced in Belgium a quantity sufficient to meet the wants of its population.

*Switzerland.*—The Alpine Republic is about the size of New Hampshire and Massachusetts together, containing 16,000 square miles, with but 15 per cent. susceptible of cultivation. The Alpine region includes 57 per cent., and has an average altitude of 8,325 feet. Forests occupy 19 per cent. of the total area. Large farms are only seen in the cantons of Berne and Luzerne, and the arable lands are mostly found between the Jura and the Alps. The grain produced fails to furnish the bread supply, though it should be remembered that 50,000 strangers reside here a portion of the year, and somewhat augment the demand. The wine product is 30,000,000 gallons, and that is insufficient to moisten the home consumption of bread. Cheese is exported, but the imports of butter are greater than the exports. The stock of cattle is little short of one million, very hardy, thrifty, some families considerably improved, and many ani-



mals quite productive in the dairy. The mountain pasture lands are divided into tracts known as *alp*ages, 4,559 in number, of which 54 per cent. are owned by individuals, 33 per cent. by communes, 9 per cent. by corporations, and a few by the State. About 150,000 milk cows are pastured, six acres being required for each cow; and a large number of other cattle are kept in these elevated pastures. The agricultural resources of Switzerland bear no comparison naturally with those of Colorado, or almost any equal portion of the Rocky Mountain region, notwithstanding the aridity of our great mountain areas. The abruptness of declivitous surfaces, and the poverty of the soil, in large portions of Switzerland, are in marked contrast to the surfaces and soils of our mountain domain.

*Germany.*—The German Empire exhibits to the world a miracle of industry and thrift in agriculture. The northern portion from Berlin northward is naturally little better than a desert of sand, and southward the improvement is small and slow until the neighborhood of Dresden is reached. Saxony and Bavaria are the most fertile provinces. Grains, potatoes, sugar-beets, forage-roots yield abundant returns for the patient labor and constant fertilization required; wheat does not equal the yield of England, being at the rate of 17.1 bushels per acre, yet the wonder is that so large a product can be secured. The latest average for rye is 16.7 bushels; for oats, 32.9 bushels. As in Great Britain and other countries, there is a marked tendency to improvement of stock and the increase of meat supplies. Formerly wool was paramount in sheep-husbandry, mutton being altogether subordinate. The original families of Spanish merinoes became founders of a new order of ovine nobility, the Electoral in Saxony, the Negretti in Mecklenburg, and the Electoral and Negretti in Silesia, which became famous throughout the world, ultimately supplying an extensive demand from Australia, from South Africa, and South America, and a more limited demand from the United States, where the American breeders of the same Spanish families commanded the preference of a large majority of wool-growers. Now, the production of fine wool is declining in Germany, and the Southdowns and Leicesters of Great Britain are eagerly sought. The present numbers are reported officially at 29,000,000, of which about 14,000,000 are merinoes and other grades, 7,000,000 of pure or partial English blood, and 8,000,000 of native races. The wool production is estimated at 180,000,000 pounds. It is found that the mutton-breeds are more profitable on the best lands and in the densest populations, while in regions remote from market and sparse in population the merino still maintains its former sway.

The cultivation of the vine has become an extensive rural industry in Germany, requiring the use of 360,000 acres in vineyards in Saxony, Bavaria, the Rhine, and Moselle Valleys, and other portions of Southern and Western Germany. The business is characterized by increasing care, better culture, and superior skill. New varieties have been introduced, and improvements in the manufacture and treatment of wine. In Bavaria the practice of setting vineyards with poles and wires has obtained to a considerable extent.

Flax and hemp are prominent products in Silesia, Westphalia, Hanover, and the Rhine Provinces; and hemp is grown extensively in Baden and Alsace. Foreign flaxseed is chiefly used, and the home manufacture requires an import of foreign flax. Recent improvements in machinery for preparing the fiber are giving an impetus to the business. Tobacco is a profitable crop in some sections; at Pfalz a tobacco of peculiar character is grown, valuable for wrappers, to the extent of more than 60,000 acres, yielding about 11 cwt. per acre. Hops are grown largely in Bavaria, Hesse, Posen, Brunswick, and Baden. Between 1850 and 1860 the business was extended too rapidly, resulting in low prices followed by a temporary check in production, which is now increasing again. The practice of training the vines on wires has become very general.

Diligence, patient persistence, a gradual but steady march of improvement appear to characterize every department of German agriculture.

*AUSTRIA.*—The soil of Austria is far superior in fertility to that of Prussia, especially the valley of the Danube, a vast plain, much of it level as the prairies of Illinois, and apparently equal in productiveness to average western lands. It has been subjected to a somewhat exhaustive system of culture for a long period, and it bears with remarkable success this test of its capabilities. There is little waste land in Austria proper. With an area nearly three times that of the State of Ohio, or 75,000,000 acres, 69,000,000 are productive, or 92 per cent. of the whole. These productive lands are divided into plow-lands, which aggregate about 24,000,000 acres, nearly two-thirds of which are in Galicia and Bohemia; meadows and gardens, 8,500,000; vineyards nearly 500,000; pastures, above 13,000,000; forests, 23,000,000. Rice is grown to some extent on the coast-lands, and about 40,000 acres are set in olive and chestnut orchards in Dalmatia. In a portion of the vineyard-land, olive and fruit trees are set at regular intervals, and a double crop obtained; and in the coast provinces there are 10,000 acres in which grass and grain are grown in the intervals of the vine-rows. Fruit-trees are also planted to some extent in the pasture-lands. In the Alps there are tracts amounting to 210,000 acres which are alternately plow-lands and pasture-lands. This alternation is now disappearing. In Moravia, in 1866, there were 140,000 acres of such lands, and in 1871,



scarcely 30,000. At 2,000 feet elevation, in Styria, a system of harrow culture is in practice upon fully 500,000 acres.

Since 1861 the productive area has increased over 3 per cent. As elsewhere in Europe, the tendency to increase of farm-animals, and especially to their improvement, with reference to increase of meat, milk, and wool, is manifest. The meadows have been increased in ten years 8 per cent., and the pastures 18, while the forests have been diminished 16, and the vineyards 12 per cent. The recently reported yield of cereals is, for wheat, 15.2 bushels; rye, 14.7; barley, 17; oats, 19; maize, 15. Maize is a somewhat prominent product of this country, as well as of Hungary and Italy. In a favorable season a small export occurs, as in 1869, when nearly 5,000,000 of bushels were exported; but in 1871 the imports exceeded the exports by more than 1,000,000 bushels. The only provinces having a surplus of bread-products are Galicia and Moravia; Bohemia and Lower Austria have a small surplus in good harvests; other districts always have occasion to import, mainly from Hungary, though in recent years a small trade has sprung up with Western Europe.

The beet-sugar interest is prominent, having now 190 factories in operation, of which 126 are in Bohemia. The average price of dry beets is 4 florins and 80 kreutzers per centner, or about \$2.40 for 136 pounds. The industry gives employment to 31,858 men, and 18,939 women, the wages of the former ranging from 18 to 80 cents per day, and of the latter from 13 to 75 cents.

During the exhibition in Vienna there was a permanent show of the dairy-stock of Austria made by the agricultural societies of the provinces, comprising three type specimens of each distinctive breed, if breeds they can be called, viz, the self-colored breeds, the Mariahofer, of grayish color, good keepers, the yield of milk from each of these cows ranging daily from 8 to 15½ liters, the heaviest weighing 1,038 pounds; Lavanthal, from Carinthia, white, small-boned, early maturing, weight 890 to 1,065, the best yielding 10½ liters; the Stockerauer, from Lower Austria, dark gray, meat-producers, valuable for crossing with Dutch stock, weight 905 to 1,075 pounds, yielding 8 to 11 liters of milk; the Oberinthal, from Tyrol, originating among the Alps, light gray in color, desirable as milch-cows, light of weight, small-boned, weight of exhibited specimens from 790 to 980, yielding from 7½ to 12½ liters daily; the Murzthal, from Styria, dark gray, good as milch-cows, and valuable for working, weighing from 892 to 1,057, the milk of the three ranging from 9½ to 14½ liters each; the Podolische, whitish cattle from Galicia, originating in the wild oxen of Moldavia, quick, hardy, escaping disease, useful for work, weight 1,015 to 1,072 pounds; the Opocner, from Bohemia, crosses of Swiss and natives, dark brown in color, much sought by milkmen of Prague, but nearly extinct since the war of 1866, the best giving 11½ liters of milk; and the Montafuner, light brown, from Voralberg, good tempered, 950 to 1,087 pounds in weight, giving milk 300 days per annum, yielding respectively 9½, 11, and 12 liters daily. Besides these were several tribes of spotted or striped stock, the Kuhlender from Moravia, the Pinsgauer from Salzburg, the Molthaler from Carinthia, the Pustenthaler from Tyrol, the Zillerthaler from Tyrol, the Lichten from Upper Austria, the Egerlander from Bohemia, and the Gfohler from Lower Austria. Diplomas were awarded for the Lavanthal, the Oberinthal, and the Montafuner. The latter are symmetrical and handsome animals, coming very close to the English breeds in perfection of development, but scarcely equaling them in harmony of proportion.

**HUNGARY.**—Hungary, though a part of the Austrian Empire, prefers to be regarded as a distinct nationality. Hungary proper is about the size of Illinois, and occupies in Europe very nearly the position held by that State as a producing section. The level plains of the Danube Valley are among the very richest lands of Europe, and have long been the granary of Central Europe, to which the hungry of the German states, as the Canaanites went down to Egypt to buy bread, have made pilgrimages in search of food in seasons of scarcity.

The condition of the peasantry has been much improved. The *robot*, a labor-tax payable to the nobility, was abolished in 1848, and the wine-tax and game restrictions have been abolished. Every feeholding peasant or householder now possesses his property in fee-simple, by the same title that secures the possessions of the nobility. The land is now occupied, about one-third by small proprietors, holding from five to thirty jochs, (a joch is 1.4223 acres,) or seven to thirty-five acres; a third to a medium class, owning from 30 to 200 jochs; and a third to those owning from 200 to 10,000 jochs. The number of holdings is 2,486,255, of which 2,348,110 are small farms. Three-fourths of the land belongs to individuals, and the remainder is held in mortmain, or by the Crown—the government lands comprising 2,700,000 jochs, or six per cent. The price of land has advanced greatly during this period of political change. Formerly 50 to 60 florins per joch was a common price, now in some neighborhoods lands can be had for 100 florins; moderately productive lands in better situations command 200, and occasionally, under the competition of active demand for small tracts which are very productive, 400 florins are obtained. This is equivalent to \$140 per acre.

There are two races of cattle, those of the plains, which are white, large, with long horns, herds of which form a striking picture on their broad and level pastures; and

those of the mountains, the Liebenburger, a mountain race, yellow and brown in color, small, compact, with short horns. The plains cattle are alert in movement, hardy, enduring changes of climate, and fattening readily. In Hungary proper there are 1,072 sheep to every 1,000 of the population. This is a larger proportion, in comparison with population, than is found elsewhere in Europe. The increase has been 33 per cent. since 1857. The number of sheep in 1870 was 15,077,000; of cattle, 5,279,000; of horses, 2,158,500; of swine, 4,443,300.

The great industries are flour-manufacturing, pork-packing, and grain-selling, making the country appear more like home to a western American than any other part of Europe, and the great maize-fields do not detract from the similarity; but the people, their language, their manners, their methods of industrial labor, and their agricultural machinery are all strange, and many of the comparisons instituted by the Westerner are not favorable to the progressiveness of the country. Still he will find our reapers and mowers there, and coming in yet more rapidly, while the old ladies of the harvest-field look on with sorrow, wringing their hands, with tears in their eyes, as they behold for the first time an innovation which they fear may take the bread from their own mouths.

ITALY.—In passing rapidly through Northern Italy among the most striking industrial features of the country was the vast system of irrigation in operation there, by which the clear Alpine waters are swiftly conveyed in broad and deep channels through every portion of the productive area, and distributed by a net-work of minor streams, giving refreshment, verdure, and fruitage to fields that would otherwise be dry and dreary in their comparative barrenness. There was almost a monotony in the appearance of the fields, though there was variety in unity from Trieste to Venice, from Verona to Milan and Arona, at the base of the mountains, an almost continuous field of maize, broken by parallel lines of the mulberry, which were kept closely trimmed and hung with festoons of vines. Thus three crops are grown on the same land, furnishing food, drink, and clothing. Polenta, a sort of hasty-pudding, appears to be the principal food of large numbers; it is used everywhere, sold on the markets cut in slices, taken for lunch in the field or at home, and always acceptable. Perhaps no other food could so well support so large a population.

FRANCE.—This distracted country fills an important place in the production of Europe. It is a country noted for scientific experiments in agriculture; it has 43 farm-schools under the supervision of the government, several official veterinary and other establishments for the advancement of rural industry. It makes a profitable specialty of sugar-beet production, and about 4 per cent. of its territory is devoted to the cultivation of the vine. The cereals are grown in far larger proportion to cultivated area than in Great Britain, but their yield per acre is little more than half as great, and not much greater than our own rate of yield. The practice of Great Britain is reversed: instead of two acres in restorative to one of exhaustive crops, the exhaustive area is two to one. With all this prominence given to bread-producing grains, there is a scarcity of animals and domestic fertilizers, and the result is a frequent necessity for a small import of breadstuffs. Of live stock, the horse receives the most attention, and the race of Normandy is still sought for export to foreign countries.

#### AGRICULTURAL TENDENCIES.

No intelligent observer, in taking even a cursory view of the agriculture of the Old World, can fail to see that the agricultural mind is active, inventive, as well as receptive; that more of energy, method, and business acumen are being infused into rural industry; that the tendencies of progress are, many of them, in the same direction in which earnest minds in this country have been pushing, perhaps more impulsively, possibly not so successfully. I will name of these tendencies a few only:

First. More liberal and general provision for fertilization. It is seen that the lands naturally the most fertile are not those on which the largest crops are actually produced, and that the fertilizing resources of earth and sea and air are sufficient to convert into a garden a desert of sand. And while commercial or chemical stimulants are found in some cases profitable, it is seen that better results at a lower cost may be secured by the production and feeding of roots and forage plants to farm-animals, and a wise economy of accessible and inexpensive local material for ultimate plant-food.

Second. More judicious and economical drafts upon stores of plant-food in the soil. Local causes may make a temporary demand and an enhanced price, and the result in the next season is an unnecessary production and an unremunerative price. This is an unnecessary waste of plant-food. A constant succession of plowed or hoed crops, especially under the exposure of a hot sun, is found to dissipate rapidly important elements of plant-growth. A proper regard for rotations, which keep the surface covered with a carpet of green at least half the time, will greatly economize such waste. Cool judgment, exact system, constant vigilance, enable the farmer to get more money and even larger production from the same expenditure of plant-material in his soil.

Third. Increase of labor-saving appliances and implements, and the substitution of



steam-power for horse-power. This tendency is marked; its results are signal. A few years ago the mower and reaper exhibited in Central Europe was looked upon in open-mouthed wonder; now it is a practical thing, beginning to be everywhere sought as a necessity. At Leeds, England, I visited the works of John Fowler & Co., where hundreds of mechanics are engaged in the fabrication of steam-plows, not only for pulverizing the soils of England and the Continent, but the valley of the Nile. There are now seven of them in use in this country. The works of the Messrs. Howard, and of Porter & Aveling, are also turning out large numbers of similar machines. Prejudice against them is breaking down; farms are being fitted to their use, fields squared, hedge-rows eradicated, ditches filled, and all other improvements following in the train of these. The best cultivation in this country must and will, in a future day, be accomplished by the aid of steam.

Fourth. Increasing intelligence and awakening emulation among farm-laborers. This is prominently seen in Great Britain; and the bonds of caste are slowly loosening in Central Europe, and medieval stolidity is gradually yielding to the mental mobility of the present age. It is now freely acknowledged in England that the demand of the farm-laborer for more wages, a better cottage, and a little allotment of land with it, is but the outgrowth of advancing civilization and education; it will be acceded to—by some cheerfully as the dictate of justice, by others without much hesitation, under the compulsion of the fear of losing their labor by emigration to America, Australia, and New Zealand. The day is past for contentment with an average of thirteen shillings per week for the labor of an able-bodied man and the support of his family. And even this is munificent compared with the wages of rural labor in some other countries. The employers are already counseling each other to meet the emergency by a higher style of cultivation, a larger use of machinery, a wiser economy of land and labor, and a more general use of steam in the various operations of agriculture.

There is one painful aspect in which the traveler views the labor of all the continental countries—the heavy, harsh, exhausting, murderous drudgery of woman. While the men appear to be playing soldier, the women seem to be the main reliance for producing the food of all, as well as cooking it, for making the clothing worn, and producing the materials of which it is made. It is bad enough to see the minor transportation of cities carried on by teams constituted by harnessing a dog to one side of a wagon-pole and placing a woman on the other, or great buckets like flattened wash-tubs borne full of water on the shoulders of women, under which they stagger with a fortitude worthy of a nobler destiny; or a bevy of barefooted females, old and young, climbing the walls of a five-story building under the burden of hods of brick and mortar. It is worse, if possible, in the free, pure air of the country, to see a woman and a bullock harnessed to a plow, a sight I am thankful not to have seen, if it exists, as is frequently reported. If that is an exaggeration, it is certainly true that in many districts a large portion of the labor of the farm is performed by woman.

Fifth. Association for improvement and for protection of property in labor on the part of those whose only property is labor, and co-operation for greater economy and higher profits by those who would employ jointly their present efforts with the accumulated surplus of past labor. Such associations are quite general in England, and their influence is extending to the continent. It is gratifying to know that some of these forms of association have been borrowed from this country, as the cheese-factories of England and the condensed-milk factories of Switzerland and Great Britain. These combinations for more effective use of small means will increase and prove salutary and profitable here as well as in Europe; but when not managed with wisdom and prudence will end, in many cases, it is feared, in mischief and failure.

I am strong in the belief that the rural population of this country will yet lead in most, as it now does in some, of the progressive movements destined to lighten the hardships of weary toil, to enhance the profits of honest labor, to render cheerful and jocund the life of the country, and to elevate the art of agriculture by all the means that applied science can furnish or business tact and wisdom can procure.

## BELGIAN AGRICULTURE.

From a statement published by authority of the Belgian minister of the interior, and prefacing the catalogue of agricultural products in the Belgian section of the late Vienna Exposition, it appears that the total area of the kingdom is 2,945,506 hectares, or 7,278,640 acres, of which 2,663,753 hectares, or 6,582,400 acres, are under cultivation. The population is 5,087,105, or 448 per square mile. The soil is naturally sterile; scarce a blade of grass can be made to grow without manure; yet such is the excellence of the system of agriculture, that about one and a quarter acres per capita yield a comfortable support to the densest population in Europe, besides yielding a large surplus for export. These mag-



nificent results are secured by an unwearied struggle with natural difficulties, a constant renewal of the artificial conditions of production, and an intelligent use of the latest principles, processes, and implements of culture; steam-plows, grain-drills, horse-hoes, mowers, harvesters, thrashing-machines, and all other contrivances whereby the muscular force of man is supplemented and extended over nature, are of general if not universal use. Small cultivators of limited capital either form associations for the common ownership and working of the more expensive forms of machinery, or employ itinerant steam-plows, mowers, and thrashers, of which there is an abundant supply. The sterility of the soil is overcome by a liberal application of fertilizers. Every atom of domestic manure is saved with scrupulous care and protected from both rain and sunshine. The droppings of animals on the highways are swept up; the bones of dead carcasses are pulverized; the sewage from towns and cities and the mud from rivers and canals are elaborately utilized. Incredible sums are also invested in imported fertilizers.

#### FACE OF THE COUNTRY.

The small territory of Belgium presents a remarkable variety of soil and climate, necessitating a corresponding variation of treatment. The Ardennes Mountains enter the kingdom from France, crossing it a little south of Namur, presenting a considerable amount of broken surface; the maximum elevation, 2,000 feet, is found at Spa, near the city of Liege. North and northwest the surface slopes almost imperceptibly toward the sea, the minimum altitude being at Groenendyck, in East Flanders, about 5 feet above sea-level.

#### CLIMATE.

The climate varies with the altitude, and is remarkably free from extremes. Near the coast the clouds prevailing during the winter arrest surface radiation, and prevent a very low temperature; yet the climate is colder than on the opposite shores of England, which feel more strongly the ameliorating influences of the Gulf Stream. The aggregate rain-fall is not great, yet it is so well distributed as to give the impression of a rainy climate, while the slowness of evaporation keeps the soil moist. Eastward, these conditions change. The rain-fall remains nearly the same, but a clearer sky gives greater scope to nocturnal radiation and evaporation. This causes a greater difference between the temperatures of day and night, giving rise to more frequent and destructive frosts. Upon the southern declivity of the Ardennes range the climate again becomes milder, and a more luxuriant vegetation marks the approach to the favored countries of Central Europe.

#### SOIL.

The soil presents well-marked variations, giving rise to seven distinct regions or zones, the statistics of which are carefully segregated in the official returns of the kingdom. Of these, beginning at the sea-coast, the first is:

1. *The region of the Polders*, a zone eight or ten miles wide, stretching across West Flanders, the only maritime province of the kingdom. This portion of Belgium excels all the other regions in natural fertility, the soil being a compact clay of marine or partly fluvial origin, mingled with lime from decomposed sea-shells. The alluvions which constitute this soil, varying from 2 to 6 feet in thickness, are underlaid by a bed of peat, which crops out in many places and supplies an excellent domestic combustible, the ashes of which serve as a fertilizer to

crops. The Polders, being generally below high tide, would be overflowed but for a natural dike of dunes. The area is stated at 97,304 hectares, or 240,448 acres; the population at 106,003, or 282 per square mile. This rate, being far below the average of the kingdom, is explained by the fact that the great manufacturing populations are found in the eastern provinces.

2. *The region of sands*, skirting the Polders on the south, embraces parts of East and West Flanders, Antwerp, and Limbourg. To this class of lands is also referred the narrow dike of sand, between 300 and 400 yards wide, interposed between the Polders and the sea. This region is subdivided for statistical purposes into the zone of Flanders and the zone of Campine.

*The zone of Flanders* presents a large plain of low altitude, scarcely averaging 160 feet above tide-water. The soil is a thin stratum of sand through which the clay subsoil frequently protrudes, greatly improving its character. This subsoil abounds in pebbles and iron oxides, which, in many places, harden into a tufa impermeable to vegetation. This soil, so little favored by nature, has been made very productive by energetic cultivation, and by the copious application of pulverized and liquid manures, night-soil, &c. This zone is characterized by a great variety of cultivation and by the frequent recurrence of "stolen" or second crops. The land is divided into a great number of individual proprietorships. The leading agricultural pursuit is grain-raising, which absorbs about a third of the total area. Rye is the favorite crop, then wheat, potatoes, grass and fodder crops, flax, &c. Those crops which are called in Belgium the "industrial crops," such as colza, camelina, poppies, hops, flax, chicory, &c., on account of being the base of local manufactures, are cultivated concurrently with the "alimentary crops," *e. g.* cereals, beans, peas, potatoes, &c. The area of the zone of Flanders is 368,884 hectares, or 911,549 acres; the population 1,003,438, or 704 to the square mile, a density greater than that of any other region.

*The zone of Campine* is an immense sandy plain, rarely reaching its maximum altitude of 250 feet above tide-water. A large portion is covered with marshes, heathers, and dunes. The soil is generally a pure sand, often mingled with a varied proportion of iron oxides. The clay subsoil gives a fixity to this sand by mixture with it; it sometimes hardens into a tufa which defies even the pickaxe to break up. The fir is the prevailing form of vegetation, but annual plants are largely cultivated. Buckwheat and the spurry here grow almost spontaneously. Rye occupies an acreage five times greater than that of wheat, and constitutes the staple breadstuff of the country. The area of the zone of Campine is 449,752 hectares, or 1,111,382 acres; the population is 575,625, or 331 per square mile.

3. *The sandy loam region* is developed almost exclusively in Brabant, and constitutes the transition between the sandy and the loam regions. The subsoil is generally sandy, but frequently mixed with lime or clay, and is often used, like marl, for the improvement of lands. All the cereals, except buckwheat, are cultivated on a large scale. The so-called "industrial plants" here occupy a wide area. The area is 270,232 hectares, or 667,770 acres; population, 680,486, or 652 to the square mile.

4. *The loam region* extends from the Polders and sandy region southward to the French frontier, and to the Sambre and Meuse Rivers. It encircles the sandy loam region above mentioned, and the two together are frequently designated as the region of Hesbaye. The soil is con-



stituted by an argillaceous loam, sometimes called the Hesbayan loam. The subsoil is in many respects of similar composition, permeable where a calcareous mixture is found, but impermeable where the clay predominates. The agricultural character of this region is very similar to that last mentioned. Its area is 696,425 hectares, or 1,720,936 acres; its population is 1,404,499, or 523 to the square mile.

5. *The Condrusian region, or Condroz.*—The preceding regions form what may be called the base of Belgium, and are considered as a plain. Across the line of the Sambre and its extension up the Meuse lies the Condrusian region, presenting a character entirely different. It is subdivided into two zones. The first, called the *Pays de Herve*, lying between the Upper Meuse and the Vesdre Rivers, has a compact loamy soil different from that of other parts of the country. Its difficulty of cultivation has diverted farming enterprise largely into dairying and stock-raising. The butter and cheese of this region have secured a European reputation. Its area is 61,057 hectares, or 150,877 acres; the population, 164,696, or 693 per square mile.

The other zone of this region, or Condroz proper, occupies the angle of the Sambre and the Lower Meuse and a strip south of the Vesdre. The aspect of the country is one of picturesque wildness, presenting frequent geological upheavals, masses of rocks, in the clefts of which are found celebrated grottoes very attractive to tourists. The soil is thin, and varies in specific character with the underlying rocks, calcareous, schistose, &c., of the *débris* of which it is composed. At least a third of this zone is woodland or uncultivated. A black schistose soil near Huy and Liege, in the coal formation, yields a very agreeable wine, which, though not equal to French wines, is quite profitable to its producers. The teasel is grown near Verviers to a considerable extent. At Glons, Roelenge, and other localities there has grown up a considerable manufacture of "*tresses Belges*," a very beautiful fabric of fine straw for hats, which is much esteemed in foreign countries. Here also is found a considerable mining enterprise in coal, iron, lead, blende, iron pyrites, &c., besides very considerable quarries of marble, limestones, and other building-stones. The area of this zone is 487,274 hectares, or 1,204,103 acres; the population, 662,611, or 352 per square mile.

6. *The Ardennes region* skirts the Condroz its whole length, the line between them starting at Momignies on the French frontier, passing near Givet and abutting upon the Prussian frontier at Eupen near Verviers. It includes the hilly portions of Hainault, Namur, Liege, and Luxembourg. The soil is almost everywhere the visible result of the decomposition of schistose rocks, the plates of which, more or less attenuated, appear on the surface of the highways, by-paths, and hill-sides. Sometimes this decomposition gives rise to an impermeable clay retaining surface-waters in a state of stagnation. Peat-beds are quarried as a combustible, as litter for stables, and as a fertilizer. In some places the *débris* of the schist have produced a seed-bed which is amenable to cultivation. The land is treated in two ways. Near the cities, villages, and hamlets, a class of lands called "field-lands" are regularly cultivated, but the general system is called the "Celtic culture." This consists of several years of cropping intercalating with equal intervals of meadow and pasture. On the river-bottoms meadows are, in some cases, permanently maintained. The uplands are subjected, every fifteen or twenty years, to two or three successive crops of oats or rye without manure; the summits are generally avoided. The leading crops are rye and oats, with an extension of spelt and flax culture during late years. The area of the Ardennes region is 420,171 hectares, or 1,038,284



7. *The Luxembourg region* occupies the angle of Belgium south of the line passing from Munro, near Sedan, to Attert, near Arlon. Leaving the bare or wooded crests of the Ardennes, the south-bound traveler finds a country of very different character from that which he has left behind—rich and fertile meadows, a milder climate, and more varied production. The soil contains copious mixtures of clay, lime, and marl; spelt is replaced by wheat, and meslin is cultivated on a larger scale than rye. Area, 91,416 hectares, or 225,898 acres; population, 67,176, or 190 per square mile.

### RECAPITULATION.

*Table showing the area and population of the different regions.*

Regions.	Area in acres.	Population.	Population per square mile.
Region of the Polders .....	240, 448	106, 003	282
Region of the sands, zone of Flanders .....	911, 549	1, 003, 438	704
zone of Campine .....	1, 111, 382	575, 625	331
Sandy loam region.....	667, 770	680, 486	652
Loam region.....	1, 720, 936	1, 404, 499	523
Condrusian region, or Condroz, Pays de Herve .....	150, 877	164, 696	698
Condroz proper .....	1, 204, 103	662, 611	352
Ardennes region.....	1, 038, 284	163, 299	101
Luxembourg region.....	225, 898	67, 176	190

## AGRICULTURAL PRODUCTS.

The following tables show the acreage and average yield per acre of each of the leading crops in the different regions. In addition to the acreage given below, the area in orchards is given at 119,397 acres; vineyards, 717.6 acres; fallow grounds, 131,172 acres; heather, 552,922 acres; waste-land, 95,685 acres; woodland, 1,073,931 acres. No information is given in this document in regard to fruit and vine culture or live stock.

*Table showing the acreage of the several regions in leading crops.*

Crops.	Region of the Polders.	Region of the sands.		Sandy loam region.	Loam region.	Condrusian region.		Ardenne region.	Luxembourg region.	Total.
		Zone of Flanders.	Zone of Campine.			Pays de Herve.	Condruz proper.			
Wheat.....	31, 556	84, 160	35, 100	125, 400	350, 886	8, 269	43, 952	2, 401	8, 831	700, 660
Spelt.....		578	169	311	7, 424	2, 575	137, 936	9, 912	75	153, 980
Meslin.....		20, 479	1, 734	3, 548	29, 668	682	9, 847	4, 561	17, 421	87, 940
Rye.....	8, 593	174, 304	179, 740	97, 169	178, 205	5, 506	41, 505	26, 196	6, 845	715, 063
Barley.....	21, 531	18, 619	8, 550	12, 215	27, 661	1, 745	11, 260	2, 549	2, 765	106, 495
Oats.....	11, 817	52, 315	45, 288	62, 464	10, 605	6, 069	150, 455	69, 443	25, 751	434, 207
Buckwheat.....	1, 129	9, 326	23, 774	4, 754	2, 842	82	287	143	578	42, 955
Beans.....	16, 271	4, 890	1, 176	6, 436	25, 423	660	4, 611	203	20	59, 505
Pease and vetchese.....	2, 899	1, 894	1, 175	2, 849	11, 801	820	10, 515	1, 097	2, 057	35, 107
Green fodder.....	8, 152	56, 069	41, 849	58, 155	144, 973	3, 867	82, 705	26, 065	11, 096	432, 931
Hay.....	11, 231	53, 210	92, 382	36, 159	105, 556	26, 094	81, 240	96, 256	37, 897	540, 025
Root fodder crops.....	3, 714	13, 580	4, 148	11, 970	27, 379	701	7, 188	1, 408	573	70, 641
Potatoes.....	14, 152	91, 327	63, 277	57, 260	113, 138	3, 995	48, 873	24, 988	12, 071	429, 071
Hemp.....		2, 906	1, 013	348	1, 803		250	600	324	7, 244
Flax.....	4, 594	59, 672	11, 384	11, 120	47, 732		4, 831	1, 339	301	140, 963
Colza.....	2, 608	20, 593	3, 316	6, 714	28, 832		1, 134	2, 059	303	65, 549
Teasel.....						166	129			295
Tobacco.....		1, 635			2, 046			225		3, 896
Hops.....		4, 794			6, 229		270			11, 293
Chicory.....		2, 718			6, 709		383			9, 810
Sugar-beets.....	1, 377	423	677	5, 732	34, 871	240	2, 133	5	186	45, 644
Pasture.....	53, 499	28, 832	25, 039	16, 554	64, 866	28, 298	11, 493	35, 150	3, 104	266, 835

Table showing the average yield per acre of leading crops in the several regions.

	Region of the Polders,	Region of the sandy zone of—		Sandy loam region.	Loam region.	Condrosian regions.		Ardennes region.	Luxembourg region.	General average.
		Flanders.	Campine.			Pays de Herve.	Condroz proper.			
Wheat.....bush.	32.16	27.56	19.52	20.10	23.54	19.52	18.95	16.08	16.08	20.88
Spelt.....do.	37.90	32.16	34.45	36.75	33.30	36.17	34.74	34.45	34.85	
Meslin.....do.	29.28	29.39	21.82	24.12	20.67	20.67	15.37	17.50	23.21	
Rye.....do.	36.17	31.58	25.26	23.54	28.14	21.82	22.11	20.67	20.10	25.38
Barley.....do.	41.34	42.49	30.43	39.62	39.05	29.86	34.45	21.82	24.12	35.10
Oats.....do.	54.55	49.96	37.90	44.21	45.94	35.60	35.60	34.45	32.16	42.47
Buckwheat.....do.	33.88	31.58	18.37	22.74	27.56	20.67	22.97	25.71	25.71	24.87
Beans.....do.	37.90	29.86	27.56	25.84	30.43	21.82	19.52	17.23	16.65	24.52
Pease and vetches.....do.	31.01	25.26	25.26	21.82	22.97	22.97	21.82	18.37	20.67	22.80
Green fodder.....tons.	1.02	10.75	7.00	8.74	9.02	6.47	9.70	4.10	4.42	8.82
Hay.....do.	1.82	2.25	1.76	1.69	1.94	2.19	1.88	1.29	1.45	1.82
Root-fodder.....do.	17.18	20.08	6.69	15.84	17.40	14.72	14.72	2.80	6.69	13.22
Potatoes.....do.	8.03	6.25	4.24	4.91	4.46	4.02	4.02	5.60	6.46	4.50
Hemp.....pounds.	.....	8.92	5.35	8.03	7.35	.....	6.25	4.46	4.91	6.48
Flax.....do.	4.68	4.91	3.13	3.36	4.24	.....	4.02	3.12	3.12	3.71
Colza.....bush.	29.86	33.59	25.26	30.43	25.71	.....	34.45	17.23	17.23	27.94
Tobacco.....pounds.	.....	16.95	.....	.....	14.81	.....	11.15	.....	.....	11.79
Hops.....do.	.....	16.51	.....	.....	14.28	.....	8.92	.....	.....	11.04
Chicory.....tons.	.....	10.44	.....	.....	7.76	.....	5.35	.....	.....	7.04
Sugar-beets.....do.	15.61	18.30	5.80	14.72	17.40	11.38	11.38	2.68	5.36	13.72

The aggregate yield of these various crops for the whole kingdom is given as follows: Wheat, 14,657,691 bushels; spelt, 5,541,975 bushels; meslin, 2,035,442 bushels; rye, 18,123,916 bushels; barley, 3,782,943 bushels; oats, 24,111,465 bushels; buckwheat, 1,317,655 bushels; beans, 1,470,172 bushels; pease and vetches, 769,083 bushels; green fodder, 3,879,312 tons; hay, 948,515 tons; root fodder, 941,345 tons; potatoes, 1,896,649 tons, 4,669,278 pounds; flax, 52,281,156 pounds; colza, 1,823,764 bushels; tobacco, 4,934,203 pounds; hops, 10,801,647 pounds; chicory, 82,144 tons; sugar-beets, 613,101 tons.

Of the above enumerated crops the spelt, *Triticum spelta*, is scarcely if at all known in this country. It is considerably cultivated on the continent of Europe, where it is known by the name of German wheat. It is stated in the document before us that it does not produce half as much flour as wheat. Meslin, spelled also *maslin* and *mislin*, is a mixed sowing of wheat and rye, practiced considerably in Europe.

The highest average yield of wheat, 31.16 bushels per acre, is found in the region of the Polders, the only region that produces enough of this grain to supply the home demand. The lowest average is in the Ardennes, 16.08 bushels per acre. The deficiency in this breadstuff is made up by a large foreign import. Neither spelt nor meslin are cultivated in the Polders, but both are in all the other regions. In the Condroz proper spelt occupies the largest acreage, 137,936, but the highest average, 37.90 bushels per acre, is found in the zone of Flanders. Meslin is largely raised in the loam region, occupying nearly 30,000 acres, but its highest average yield is in the zone of Flanders, 29.28 bushels per acre. Rye, the largest of the grain crops, is produced mostly in the sandy and loam regions, but its highest average yield per acre, 36.17, is in the Polders. Barley and buckwheat are subordinate and supplemental crops, the latter largely employed in what are called, significantly, stolen crops. Oats are the largest crop grown, though occupying but little over half the acreage of either the wheat or the rye crops. The largest breadth sown, 150,455 acres, was in the Condroz proper, but the largest yield per acre, 54.55 bushels, was in the Polders. Nearly half

a million acres are devoted to green-fodder and root-fodder crops—that is, crops grown to furnish food for farm animals, whether of stalks and leaves, as of corn, or of roots, as turnips, &c. The largest acreage of the former, 144,973, is found in the loam region, but the largest yield per acre, 10.75 tons, is in the zone of Flanders, which also produces the largest yield of root-fodder, 20.08 tons per acre. The “root-fodder” crops occupy but one-sixth of the acreage of the “green-fodder” crops, but the former produce one-fourth the aggregate number of tons produced by the latter. The grass-crops cover a larger acreage than the wheat or rye crops. The loam region presents the largest acreage in meadow, 105,556, but the largest average yield of hay, 2.25 tons per acre, is in the zone of Flanders. The loam region also has the largest amount of land in pasture, 64,866 acres, as well as in potatoes, 113,128 acres, but the largest average yield of the latter, 8.03 tons per acre, is found in the Polders. Beans, pease, and vetches are subordinate crops. The remaining crops, hemp, flax, colza, tobacco, hops, chicory, and sugar-beets, receive the local designation of “industrial crops” from the fact that they are grown to meet the demand of manufacturing establishments in the country. These are of very limited acreage, but open a profitable scope for local industry.

## SWISS AGRICULTURE.

### PHYSICAL CHARACTERS.

In an official statement relative to Swiss agriculture, the soil of the republic is divided into three zones, the Alps, the Jura, and the Swiss plain interposed between them. The latter comprehends the southwest portion of the plateau extending from the passage of the Rhone, just below Geneva, to the defile of the Danube, near Passau. The Swiss plain lies between Lake Geneva on the southwest and Lake Constance on the northeast. The great plain of the Rhine, between the Vosges and the Black Forest, also penetrates the Swiss territory on the northwest. The Alps are divided into two mountain zones by a longitudinal depression, embracing the upper valleys of the Rhine and the Rhone and the valley of Ursern, in the canton of Uri. The mountains are evidently of igneous origin, their out-crops being of granite, sienite, diorite, serpentine, gneiss, mica-schist, porphyry, basalt, &c. The Alpine region covers  $57\frac{1}{2}$  per cent. of the Swiss territory. The medium altitude of this region, not considering the longitudinal and lateral valleys, is 8,325 feet above sea-level, the maximum, Mount Rose, being 15,000 feet.

The Jura range, skirting the northwestern frontier, nowhere attains the line of perpetual snow, its maximum altitude being 5,420 feet. It is divided into several parallel and bifurcating chains. It shows the out-crop of only sedimentary rocks, especially the lower, middle, and upper Jurassic formations, which take their name from this locality. The physiognomy of the Jura notably contrasts with that of the Alps. Arid plains are sometimes found interposed between its ridges, but its low elevation admits of abundant vegetation. It is everywhere covered with fields, meadows, pastures, or forests. It occupies  $12\frac{3}{4}$  per cent. of the national territory.

The Swiss plain, the principal seat of the industry and commerce of the country, is a plateau rising to a medium altitude between 1,200 and 1,350 feet above the level of its great lakes. Several chains of hills and mountains traverse this plain; their summits reach an elevation of 4,000 feet. In this section are found the remarkable cities and the agricultural regions of Switzerland; it covers  $30\frac{1}{8}$  per cent. of the republic.



## CLIMATE.

Local climates are subject to special influences, greatly modifying the effect of altitude. For instance, the canton of Grisons, in the southeast, is exposed to cold winds, which contracts the range of vegetation. The canton of Valais, isolated by high mountains, enjoys a genial and equable temperature. Some parts of the country are darkened by fogs. At Berne, for example, the year averages 66 days of fog—16 in spring, 30 in autumn, and 20 in winter. Great St. Bernard averages 91 days of fog per annum—26 in spring, 19 in summer, 25 in autumn, and 21 in winter. At St. Gothard the foggy days number 278 per annum—71 in spring, 79 in summer, 70 in autumn, and 58 in winter. The same variation is visible in the amount of rain-fall. At Geneva it is 31 inches per annum; at Zurich, 32; at Berne, 42; at the foot of the Alps, 42; at Great St. Bernard, 73. On the northern slope of the Alps the rainy days average 120 per annum; on the southern slope, 90 days. The government has established 84 meteorological stations, which have made valuable contributions to meteorological science.

## POPULATION.

The population is given at 2,669,147, or about 166 per square mile. Of these, 1,566,347 are Protestants, 1,084,369 Roman Catholics, 18,431 Jews and other sects; 384,538 speak German, 133,575 French, 30,079 Italian, 3,826 other languages. Soil-culture employs 44.4 per cent.; manufactures, 34.5 per cent.; commerce, 5.2 per cent.; transportation, 1.8 per cent.; public administration, science, arts, &c., 3.9 per cent.; personal service, 6.3 per cent.; occupations not indicated, 3.9 per cent. The census of 1869 exhibits one birth to each 32, one death to each 40, and one marriage to each 141 of the population.

## COMMERCE.

The total importations from foreign countries in 1871 amounted to 153,855,664 francs, or 57.55 francs *per capita*. Of this aggregate 63,480,295 represented cereals, being 23.78 francs *per capita*; wine, 21,467,340 francs; coffee, 20,641,940 francs; sugar, 18,082,800 francs; brandy and spirits of wine, 6,157,600 francs; butter, 6,103,130 francs; flour, 4,435,950 francs, &c. The total export amounted to 42,187,692 francs; of which over two-thirds (28,939,050 francs) represented cheese. The other items were mostly cereals, flour, butter, and coffee.

## AREA AND CEREAL PRODUCTION.

The area of Switzerland is about 16,000 square miles, nearly equal to New Hampshire and Massachusetts combined. Not over 15 per cent. of the area of the republic is susceptible of cultivation. The larger proportion of this cultivable area is found in the Swiss plain, but the valleys of Jura and the Alps afford very considerable scope for agricultural enterprise. In general, landed property is minutely sub-divided, large farms being found only in Berne and Lucerne; medium properties are found in Argovie, Soleure, and Thurgovie. The cantons of Lucerne, Soleure, Fribourg, and Schaffhouse produce a surplus of grain; in Argovie and Valais production and consumption are nearly equal; in the rest of Switzerland there is a deficiency. The annual import of foreign grain amounts to nearly 4,000,000 quintals, while the export does not

exceed 60,000. It should be remembered in this connection that not less than 50,000 foreigners spend a portion of each year in Switzerland. Forests cover 19 per cent. of the Swiss territory.

#### FRUIT CULTURE.

Fruit culture is quite extensive in the cantons of Thurgovie, Zurich, Soleure, Zoug, Lucerne, St. Gall, Appenzell, and Bâle-Ville. The fruit is either dried or made into cider, in which form it forms a considerable export, especially by way of Würtemberg. Vineyards are also scattered through Vaud, Zurich, St. Gall, Argovie, Neuchatel, Valais, Tessin, and Grisons. The annual production of wine is approximately estimated at 1,155,000 hectoliters, (30,512,559 gallons,) but the home demand requires in addition the import of 800,000 or 900,000 quintals of wine, 106,000 quintals of brandy, and 44,000 quintals of beer.

#### GRASS CROPS.

In meadow cultivation the leading cantons are Lucerne, Argovie, Zurich, Berne, and Soleure; then follow in order Bâle, Schaffhouse, St. Gall, Fribourg, Geneva, Grisons, and Valais. The pasture-grounds of the Alps are divided into small definite tracts called alpages. The unit of measurement of these tracts is denominated a stoss, which indicates the area of pasture necessary for the support of a cow during summer. This area varies, according to the richness of the pasture, from 2 to 10 arpents, the average being 5 arpents and 18 perches. The arpent of Geneva is equal to 1.2766 acres. A horse of three years or younger require one, two, or three stoss; three heifers will require two stoss; a calf or a hog one-fourth, and a sheep one-fifth of a stoss.

The number of these alpages is 4,559, scattered through 19 cantons and demi-cantons, and 691 communes. Individual proprietors own 2,488 of these tracts, or 54.6 per cent.; 1,525, or 33.5 per cent., belong to communes; 80, or 1.8 per cent., belong to communes and private owners together; 453, or 9 per cent., belong to corporations; 11, or 0.2 per cent., belong to the government. The altitude of these pastures varies from 2,000 to 9,000 feet; the actual pasturage of live stock in 1864 amounted to 270,389 stoss, and the actual number of days of pasturage of individual animals was 25,074,238. The value of the alpages is estimated at 77,186,103 francs. In 1864 153,320 milch-cows pastured on these alpages, returning 8,182,788 francs, beside 115,941 non-milking cows and other cattle, returning a minimum revenue of 2,703,463 francs. The total return, then, was 10,893,874, or 14.11 per cent. on the capital. After deducting a liberal margin for interest and charges of amortisation there remains a net revenue of 9,545,000 francs, or 12.4 per cent. At 5 per cent. this revenue represents a principal of 190,900,120 francs, which amounts fully to 200,000,000 by including the alpages not embraced in these statistics.

#### LIVE STOCK.

The aggregate value of live stock is estimated at 260,000,000 francs. The census of April 21, 1866, gave the following enumeration:

*Horses.*—Stallions, 428; other stallions two years old and upwards, 3,449; stallions less than two years old, 5,647; breeding-mares, 9,515; other mares and geldings four years old and upwards, 64,380; mares

and geldings under four years, 16,905; asses and mules, 5,475; total horses, asses, and mules, 105,799.

*Horned cattle.*—Bulls, 10,311; milch-cows, 553,205; breeding-heifers, 74,634; beef-cattle, 52,203; calves over six months old, 172,826; calves less than six months old, 130,012; total, 993,291.

*Hogs.*—Boars, 1,544; sows, 30,288; fattening hogs, 190,705; sucking-pigs, 81,951; total, 304,428.

*Sheep*, 447,001. *Sheep*, 375,482.

The foreign trade in cattle shows an import of 103,424 horned cattle in 1871 against 6,987 in 1870; and of 2,191 calves against 2,711 the previous year. The exports of horned cattle in 1871 were 51,971 against 41,062 in 1870; of calves, 8,157 against 11,683 the previous year. In 1871 the imports of butter and lard were 55,483.49 quintals against 35,404.21 in 1870; the exports were 15,492.92 quintals in 1871, and 22,149.70 in 1870. The exports of cheese exceed the imports by about 60,000 quintals.

The dairy facilities of Switzerland are attracting the attention of foreign capitalists. Among the exhibitors at the Vienna Exposition was the Anglo-Swiss Condensed Milk Company, an association of English and Swiss capitalists, which has factories at Chane, Gossau, and Fribourg, Switzerland, and at Chippenham, England. The central office is at 38 Leadenhall street, London, but their main establishment, at Cham, in the Swiss canton of St. Gall, was erected in 1866. The company has a capital of a million of francs actually invested. In 1872 it produced 3,500,000 packages of condensed milk, each weighing one pound. It has numerous agencies in Europe.

## ENTOMOLOGICAL RECORD.

BY TOWNEND GLOVER.

**PROTECTION AGAINST COTTON-INSECTS.**—The following circular on a subject, the importance of which will be generally acknowledged, was recently sent to the regular corps of Department correspondents in the cotton-growing States:

The annual losses of cotton from ravages of cotton-insects amount possibly to half a million bales in years of insect prevalence. One-fourth of a million bales would be deemed a light infliction, and yet, at \$100 per bale, such a loss would be equivalent to \$25,000,000. The methods to be employed for lessening their ravages have been heretofore canvassed by the entomologist of this Department. The remedy can only be applied by the planters themselves, and their own experience can best render practicable and efficient the means employed.

Numerous correspondents have of late been experimenting with a mixture of Paris green and flour or plaster, dusted on the plants when wet with dew—a remedy which has proved very efficient against the Colorado potato-beetle and other insects. Some report this remedy effectual against the cotton caterpillar, while others declare it of no value whatever; others still hesitate to try it for fear of poisoning. It is of the utmost importance that the facts in the experience of planters the present season should be carefully reported, showing the quality and proportions of material used, the method and frequency of its application, and the observed results, that a thorough test may be made of its value or worthlessness. The answer of the following questions is therefore requested:

1. What is the result of your experience or observations as to the efficacy of Paris green, or other arsenical compounds, mixed with flour or plaster, for the destruction of the cotton-caterpillar?



2. In what proportions, and in what mode, time, and frequency of application have experiments been made?

3. Have any injurious effects of the poison been observed, either upon the plants or the soil, or in human poisoning in its application, or in the destruction of beneficial insects, as bees, &c.?

4. Have you used any other remedies, or means of extirpation, such as fires or torches in the fields, to destroy the perfect moths on their first appearance, and with what success?

Returns have been received from one hundred and seventy different counties in the cotton-growing States, Alabama and Texas being represented by the most numerous and complete statements. Of these, one hundred reported that no experiments with Paris green, or arsenical preparations, had been tried; many were from counties in which little cotton is ever grown, and others were from counties where the worms have never appeared.

1. *Efficacy of Paris green.*—Of the seventy returns reporting actual experiment a large proportion, at least four-fifths of all, declare the success, either full or partial, of the application of mixtures of Paris green or other arsenical compounds, when they are properly applied. Some are content with the simple declaration that it is an effectual remedy. Where it is most generally used it is most approved. In New Iberia, La., where a machine that will powder 15 to 18 acres per day is in use, it is said that fifty planters have found it successful. In Wilkinson, Miss., where a simple compound of Paris green and flour was used, "rows treated with the compound were healthy and vigorous, while neglected rows beside them were destroyed." In Landry, Tex., "one application of Paris green in solution resulted in ten additional bales in a field of 35 acres, over the rate of production in other fields where none was used." A similar result is reported from Montgomery, Tex., by the use of Paris green mixed with lime or plaster, or even fine sand, where "a neighbor has picked already ten bales of 500 pounds each from 13 acres, while freedmen on the same farm lost their whole crop by refusing to use it." The correspondent in Worth County, Ga., declares it "was death to everything that eats the leaves that have been sprinkled." Some correspondents enjoin the necessity of repeated applications to meet the appearance of successive broods of worms, as enough are left after the most careful application to perpetuate the noxious race. In some cases, caution is suggested not to make the application after the bolls are open, lest it become "dangerous to picker and ginner." In the cases of failure mentioned there appears no evidence that the application was properly and persistently made, and with a pure article of Paris green. In some cases where it killed both worms and plants it is very evident that the proportion of Paris green was too large or applied too heavily.

The following extracts representing different phases of the experiment will illustrate the tenor of the returns on this subject:

*Craven, N. C.*—Has been used in the county. Checked the worms at points where applied. Rains were frequent, labor scarce, and the experiments not continued, and the cotton was eventually damaged.

*Beaufort, N. C.*—Have heard of but two instances where Paris green was used to stop the ravages of the worm, and in both cases without benefit.

*Calhoun, Ga.*—Paris green has failed, though from 7 to 8 pounds of the green were applied to the acre every two weeks.

*Jefferson, Ga.*—The remedy worse than the disease. It occasioned more loss of forms and young bolls than the insect.

*Macon, Ga.*—Patent remedy used, but not successful. Used about 25 pounds on eight acres.

*Talbot, Ga.*—Experiments too limited to furnish an opinion—and mainly with arsenic in solution. It kills both plant and insect.

*Dural, Fla.*—Experiments with compounds, of which Paris green has been the principal ingredient, have been very successful. In every case, except where an inferior article has been used, the green has exterminated the caterpillar.

*Gadsden, Fla.*—No good results. Killed plants and worms.

*Jefferson, Fla.*—Paris green and flour destroyed and drove them away. Those parts of the plantations where applied are green and thrifty, while cotton not so treated is destroyed.

*Liberty Fla.*—Paris green, combined with flour or other matter, except water, is a humbug.

*Blount, Ala.*—Two or three applications are necessary to destroy the successive broods of worms. On light cotton the cost exceeds the profit, and on rank cotton the injury produced by forcing through it to sow the poison is a considerable item, unless more than one-fourth of the crop could be saved by the application. If worms appear in July they produce much injury; but if in September, are regarded as a benefit.

*Greene, Ala.*—Kills the worm when it eats the poison. If applied on their first appearance will prove of benefit. The poison was only applied once, and killed many worms, but did not seem to stay their ravages.

*Marengo, Ala.*—Used it on a large scale. Paris green will certainly kill the caterpillar, if pure and properly applied, either in solution with water or in combination with flour, which must be sound.

*Wilkinson, Miss.*—Paris green and arsenious acid used, with some failures from improper application and impure drugs. I am convinced of the efficacy of pure Paris green and flour alone. Rows treated with the compound were fresh, vigorous, and healthy, while neglected rows were destroyed.

*Noxubee, Miss.*—It is much trouble to scatter the compound. Thus far no good has been accomplished.

*Avoynes, La.*—Paris green was used to a limited extent in this parish, and when properly mixed and applied was a triumphant success.

*Claiborne, La.*—Used patent remedies and killed worms and plants. Made it weak, and killed neither worm nor plant.

*Austin, Tex.*—Numerous experiments made with patent remedies—effectual in destroying the worm, but retarded the growth of the cotton. An unpatented combination, increasing the amount of flour, destroyed the worms without injury to the plant. The application must be made before the bolls open, and in no case after, as if dropped on the cotton it becomes dangerous to picker and ginner.

*Fayette, Tex.*—Quite a number of experiments, and all of them with good results, both with dry preparations and arsenical solutions. The effect does not appear at once, but is seen in from twenty-four to forty-eight hours. There has been much prejudice, but all will fall in next year; and, with a favorable season, we expect to take a bale of cotton from an acre. Cotton is cleaner where the green is used. Arsenical solution the cheapest mode.

*Fort Bend, Tex.*—Experiments varied and extensive, chiefly with Paris green and flour, 1 pound of Paris green to 20 or 40 pounds of flour, one to thirty being best proportion. Satisfactory; expense being about \$5 per acre.

*Freestone, Tex.*—Mixing the green with flour or other powders has not succeeded so well as the solution, and cannot be administered so cheaply or thoroughly.

*Montgomery, Tex.*—Paris green mixed, either with flour, lime, plaster, or very fine sand even, applied in the morning, from daylight until an hour after sunrise, while the dew was on the plant, has been universally efficacious. Arsenic in solution has also been used, but with little effect. It burned the leaf and caused the squares to fall.

**2. Proportions and mode of application.**—The mode and time of application, both of arsenical mixtures and solutions, are indicated by a selection of representative extracts, as follows: \*

*Jones, N. C.*—One to twenty-five. Sifted from a tin vessel having a perforated bottom, and attached to a staff 10 feet long. One or two applications sufficient. Cost, \$1.50 per acre.

*Craven, N. C.*—One to twenty-five. Shaken on to the plants from a box with a long handle when the dew was on the plants. One pound of arsenic to eight gallons of water was equally effectual. One pound of Paris green to ten pounds flour destroyed the leaves.

*Richland, S. C.*—One to twenty parts of flour.

*Jefferson, Ga.*—One to twenty-five. Killed the forms and young leaves.

*Jefferson, Fla.*—One to twenty-five. Should be applied at night when the wind is down and the dew is on the leaves. It must be repeated after a shower, or it will be rendered useless.

\*Where no other substances are mentioned, Paris green and flour by weight are understood.



*Duval, Fla.*—Royall's patent used. One to twenty-eight answers equally as well and is less expensive; costing, with labor and materials, from \$1.30 to \$1.40 per acre.

*Putnam, Fla.*—Sifted upon the plant, the operator being mounted and the animal muzzled.

*Butler, Ala.*—Apply in August when worms first appear—two applications will suffice—1½ pounds to 8 pounds flour, 50 gallons water; or 1½ pounds green, 1 pound resin and gum arabic each, with 20 pounds of flour.

*Clark, Ala.*—Used in proportion of 1 to 28 with the desired effect. Applied 6th of August, and ten days later, (the heavy rains washed it off,) by means of a bucket with sieve bottom. Have also used a spoonful of the poison in a bucket of water, shaken on by means of a shuck tied to a stick.

*Grenshaw, Ala.*—One to twenty-five, flour or lime; 1 to 40 gallons of water.

*Greene, Ala.*—One-quarter pound green to 30 gallons water. One hand rides down the rows on a mule and sprinkles from a watering-pot.

*Hale, Ala.*—One-half pound to 40 gallons water.

*Marengo, Ala.*—One pound in 20 used, dusted on by means of sieve when the plant is wet with dew or rain. At the same time used 1 pound in 40 gallons of water, (to an acre,) applied with fine watering-pots, when too dry for the powder to stick. Two applications will, doubtless, save the crop. The green is not soluble, but by keeping the water stirred, better results are obtained.

*Montgomery, Ala.*—Has been mixed in proportion of 1 pound of green to 20, 25, and 30 pounds of flour. Applied on the first appearance of the worms by means of a tin strainer.

*Perry, Ala.*—One pound in 40 gallons water to an acre.

*Clark, Miss.*—One to thirty, sifted on when worms first make their appearance in the morning, repeating in ten to fifteen days.

*Wilkinson, Miss.*—Treated with 1 to 30 by weight, sour flour, carefully mixed, per acre, and by means of a mosquito-netting bag on a pole, held over the plant and slightly tapped. This is done in the morning while the dew is on. The sun evaporates the moisture and the poison is glued to the leaf.

*New Iberia, La.*—Paris green and flour, and arsenic and lime, have each been used with equal success. They have also been used with a sprinkler. A sifter is used.

*Rapides, La.*—Best results from solution of arsenic in the proportion of three-quarters of a pound to 40 gallons (barrel) of water—1 barrel to 3 acres—used by means of a watering-pot.

*Saint Landry, La.*—One pound to a barrel of water.

*Austin, Tex.*—Proportion, 1 to 26, adding a little rosin and gum arabic; applied with a sieve attached to a forked stick, which is tapped as the operator moves along the row. Dust while the dew is on, walking to windward.

*Comal, Tex.*—Paris green 1 to 20 by weight—also used with water, 1 ounce arsenic to 1 pound water. Remedies most effectual when used in the morning.

*Fort Bend, Tex.*—No regular systems for application. Some have used sieves, others coarse netting sacks, while dew was on, some using through the day and for the third time. Arsenic dissolved in water also used with good effect.

*Freestone, Tex.*—Paris green succeeds best in solution, and is administered more thoroughly and cheaply; 2 ounces to 1 pound of green to 10 gallons water, administered with a common watering-pot.

*Lavaca, Tex.*—Royall's patent, 1 pound green to 1 pound resin, one-half pound gum arabic, and 17 pounds flour. Two applications saved the crop when worms first appeared, and on the appearance of second crop.

*Leon, Tex.*—One-fourth to one-half pound arsenic in water to an acre. Sprinkled with common sprinkler.

*Sabine, Tex.*—One-half pound green, 10 pounds flour, 10 pounds lime, and 1 pound resin to an acre. Put three-fourths of this amount on at intervals of four weeks when the worms first appear would be the best mode.

3. *Injuries or poisonous effects.*—Nearly all returns made reference to the matter of poisoning or injury from the application, and most of them stated positively that no injurious effects were observed. Several assert that when too liberally applied, or in too strong a solution, the leaves are spotted or killed. In Rapides Parish, La., "in some cases plants were injured and nearly killed by the Royall's mixture," and in Claiborne Parish "a patent remedy killed plants." In Avoyelles, La., "caused blooms to shed to a limited extent." In Sabine, Tex., our correspondent's stock roamed at large over the field with no injurious results. "Reports of horses and mules dying from licking the poison from the stalks" are returned from Brooks, Ga. Our correspondent in Worth, Ga., says: "Stock has been poisoned by eating the cotton, and it



has made several persons using it giddy when advantage was not taken of the wind. Turkeys and chickens have been killed from eating the dead worms." It is deemed a decided advantage in Putnam, Ga., that it kills the noxious weed known as beggar's lice. There are reports from Crenshaw, Ala., of "a few cases of injury to human beings and to stock and some destruction of birds eating dead worms," but no particulars are given; and a similar report from Carroll, "one or two cows killed from eating the cotton." One correspondent expresses the opinion that it will prevent the pasturing of cotton-fields after the picking is over. The Craven (N. C.) correspondent says: "No inconvenience from poisoning where the right proportions are used. The caterpillar or flock bird feed upon these worms in the same fields where the poison is strewn, and grow very fat. Sportsmen kill these birds and thousands eat them, yet have not heard of any one being injured."

4. *Means of destruction.*—Most of the returns fail to indicate the use of any other than arsenical compounds for the destruction of cotton-insects. Several declare definitely that no others have been tried. Of those which are reported the following extracts will give an idea:

*Jones, N. C.*—Fires or torches are of no service. Carbolic soap has been tried and believed to be good. It is used in the proportion of one gallon of soap to ten of water.

*Beaufort, N. C.*—Ravages stopped in one field by a flock of turkeys.

*Granville, N. C.*—Turkeys saved the crop.

*Worth, Ga.*—Ceasing to cultivate cotton for a year or two, and resting the lands, is the remedy.

*Sumter, Ga.*—Fires and lamps are worthless.

*Jackson, Fla.*—Tin lanterns of peculiar construction, also torches, have been used with success.

*Gadsden, Fla.*—Turkeys highly recommended. Kerosene-oil and turpentine in small quantities in water have been used with some good effect.

*Orange, Fla.*—Birds are encouraged, and we find it pays.

*Butler, Ala.*—Torches and fires, with little or no success.

*Carroll, Ala.*—Fires used with no effect.

*Jones, Miss.*—Fires will retard the progress of the caterpillar.

*Noxubee, Miss.*—Fires and torches in some instances seem to have done good. The best remedy is early and clean cultivation.

*Madison, Miss.*—Fires and lamps used with only partial success.

*Clark, Miss.*—Fires, torches, and small lamps used with only partial success. Would be more useful if practiced by every planter in a neighborhood, as it attracts the moths from neighboring farms.

*Warren, Miss.*—Early in July last sheet-iron pans, 18 by 15 inches by 2 inches deep containing coal-tar to the depth of  $\frac{1}{2}$  inch—and about 4 inches above the center of each pan of tar a lantern was secured—were placed on stakes something higher than the cotton-plant, set about 100 feet apart in the field, and light being placed in the lanterns at night many millers or moths were destroyed, but without perceptible relief. Earlier commencement and a more general effort in a similar direction may accomplish something in future. No poisons were tried.

*Bossier, La.*—Running a sweep-plow through the rows does more good than anything else. It rakes the worms off the cotton and covers them up.

*Comal, Tex.*—Large lamps set in pans of molasses used extensively through the country. One lamp to one hundred yards square, lighted at early dusk. Moths were collected with very favorable results.

*Lavaca, Tex.*—Night lights have been used. Unless universally adopted by all farmers not much benefit derived, as the light attracts from adjacent fields. Fields where lights were used have been known to be first destroyed.

**CONCLUSIONS.**—From the answers to the various questions above quoted, the following is a summary of the conclusions:

The use of Paris green, when pure and unadulterated, mixed with flour in the proportion of 1 part of Paris green to 25 to 30 parts of flour, is of utility, and in many cases has saved the crops; that in many instances where the Paris green has failed it has been attributed to improper use or using a spurious article. Paris green or arsenic, also used with water and sprinkled over the plants, has been used with good effect,

but to be of any avail the water must be well mixed up and stirred at the time of using it, as the Paris green or arsenic is only partially soluble in water, and requires to be thoroughly disseminated throughout the water, to be deposited as a slight coating of poisonous powder on the leaves to be of any avail. When Paris green or arsenical compounds are used great care must be taken not to make the mixture too strong, or they will kill or injure the leaves and plants. When used as a powder dusted over the plants, the plants must be wet in order to make the powder adhere to the leaves. Rains will wash the mixture away from the leaves, and it will have to be renewed after heavy showers. Some glutinous or sticky substance may be used with the Paris green and flour in order to cause it to adhere to the leaves, but it is not necessary. Sour or spoiled flour will answer as well as the best; plaster, ashes, and even dust have, in some cases, been substituted for the flour, but has not answered the purpose as well as flour. Applying the Paris green on the first appearance of the caterpillars is recommended, and as soon as possible after the second crop of worms appear on the plants also. No notice has been taken of patent insect-destroyers, as the patentees claim a private and exclusive right to use them. Only a very few cases of injury to man or beast have been observed, and even some of those cases are not well substantiated by proof. It, however, would be well to caution persons using this poison to be on the windward side when dusting or showering it on the plants, and not to let stock in to feed upon the foliage. The prejudice of the negroes against using Paris green is now partially removed. The application of Paris green not strong enough to injure the cotton will kill the beggar's-lice weed in the rows. One or two of the favorable accounts of the success of Paris green in certain localities must be considered, however, as occurring in the same neighborhoods where the worms mysteriously disappeared in neighboring fields *without* the aid of the poison. Fires are said by some planters to be of use in attracting and destroying the moth or miller, and by others to be injurious, as attracting moths from neighboring plantations; and it has been observed that the cotton has been very much attacked immediately around such fires afterward, as if the moths had been attracted by the fire and deposited their eggs in the vicinity. Torches are of no avail unless generally used by all the planters in a neighborhood, except when placed over pans or dishes containing some adhesive substance, and into which they fall. Great complaints have been made by planters about the indiscriminate destruction of insectivorous birds, which ought to be protected by law, as they are exceedingly useful in destroying the cotton-caterpillar. Some planters used salt-water in the proportion of a gill to a bucketful, and thought they experienced beneficial results from its use, while others plowed between the rows with pine brush fastened to the swingle-tree in order to sweep off the caterpillars from the plants onto the ground, where they are either buried under the earth or scorched to death before they are able to re-ascend the plants. Kerosene-oil, cresylic soap, and other preparations have been used, but to no great extent, though with some beneficial results. Turkeys driven into the field, as in the case of the tobacco-worms in Maryland and Virginia, will quickly exterminate many of the caterpillars, and have been highly spoken of by three of our correspondents.

In many cases the correspondents consider that when the cotton is attacked quite late in the season, and after the last bolls are formed, the caterpillars are rather a benefit than injurious, as by eating off the dense foliage, the air and sunlight being admitted, the bolls that would otherwise not ripen and open are fully matured.



**THE PHYLLOXERA.**—The following article from the Bulletin des Seances de la Societe d'Agriculture de France, 1872, p. 514. may be of interest to some of our vine-growers as showing the good effect of an application of soot for the destruction of the grape-vine root gall-louse. However, not having tried the soot ourselves, we can only give the experience of others, and add that Dr. Erni, formerly chemist to the Department of Agriculture, in a letter from Berne, Switzerland, has also highly recommended the use of soot for the same insect.

M. Rogier, mayor of Poule Gard, exhibited to the central society of agriculture the results obtained by the use of soot in the treatment of vines attacked by the *phylloxera*. A young vine attacked by this insect in 1869 was treated with soot put at the foot or root of each stem in the quantity of a half kilogram, (about one and one-tenth of a pound.) The vine recovered. The following years all the stems which composed it were smoked with soot. This vine has a remarkable vigor, while the neighboring vines were dead or seriously injured. All vines treated with soot, used as a preservative compost, are healthier, although surrounded with diseased vines.

We give the above extract for what it is worth, and hope some of our correspondents will try soot and report the result to the Department, as we have scarcely any of these destructive insects in our own immediate neighborhood. In reference to this insect, the grape-root gall-louse, the Department has received a very interesting letter from Mr. George W. Campbell, of Delaware, Ohio, in which he expresses his opinion that the aphid (*pemphigus*) affecting the leaves and that upon the roots are not identical. He says:

I have since then found in two instances what were doubtless eggs of the *phylloxera* (root-gall-louse) upon diseased roots the same as those within the galls, but solitary, and not in clusters as in the galls. This, I think, settles the question, that the aphides infesting the roots are propagated under ground, upon the roots, and that they are probably not the same as are propagated in the galls upon the leaves.

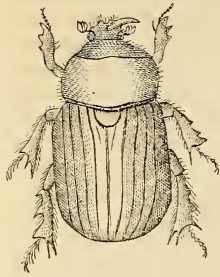
Mr. Campbell also sent specimens of the roots injured, together with numerous root gall-lice clustered upon them, but although carefully examined with the microscope we failed to find any eggs whatever upon the roots sent. These roots, however, have been planted just as received with the insects upon them in a flower-pot and placed in a large wardian case in close contact with other pots containing healthy vines, in order to find out if the insects will pass from one vine to another during the winter, and if the healthy roots will next season be infested with either root or leaf gall-lice. We give Mr. Campbell's remarks, merely to stimulate further inquiry into the identity of the two insects, as many naturalists have stated them to be merely varieties of the same insect. In France it appears that flooding the vineyards at certain seasons to drown the insect out has been recommended, but this plan even if successful could only be carried out in level places, and could not be adopted in side-hill vineyards.

**THE COLORADO POTATO BEETLE.**—In reference to this insect, *Doryphora 10-lineata*, our correspondent in Dodge County, Nebraska, sends the following:

As soon as the soft bugs or grubs are hatched in the early part of the spring, I harrow the patch with a slanting (backwards) tooth harrow; the beams knock off the grubs and the teeth bury them in the soil, from which they have not power to rise. When the plants are over 6 inches high I use a two-horse four-shovel corn-cultivator having hung sticks of round fire-wood, 3 feet long, by ropes transversely across the frame about a foot and a half in advance of the shovel-blade; the dangling sticks knock off the grubs, and the shovels effectually bury them. I do this in the middle of a hot, dry day, and have kept two acres completely clean by going through once a week, thus keeping down the bugs and the weeds at the same operation. Two to three hours' work of this kind will accomplish more than a dozen children in a whole day with sticks and pans, according to the old way.



**XYLORYCTES SATYRUS.**—A very large black beetle with a short horn on the top or front of its head has been very injurious to young ash-trees in the neighborhood of Babylon, Long Island, where it has appeared in great numbers according to a letter from a correspondent, Mr. P. H. Foster, who states that after expending five days' labor in digging out the beetles his foreman estimated the number destroyed at one bushel, while Mr. Foster himself thought there were at least twenty-four quarts. He says:



We found as many as fourteen at the root of one tree 8 feet high, and have looked over about 6,000 trees, mostly white-ash, and a few European, (*F. excelsior*;) and out of this number 1,500 had holes around them; these we opened and obtained the above results. I did not discover their depredations until they had destroyed a number of my young trees. Another season I shall study them more thoroughly.

The insect alluded to is known to entomologists by the name of *Xyloryctes* (wood-borer) *satyrus*, of Burmeister, and is not very uncommon in this neighborhood, where it has been taken at the roots of ash-trees. The larva resembles the white grub of the corn-field, which is the larva of the May-bug, *Lachnosterna*, but is of a much larger size, and has a black head instead of the head being of a red color as in the common white grub. These larvæ feed on the roots of ash-trees, and have been taken also on liquid amber, a sweet gum, in Maryland.

The best way to destroy them is, in spring and autumn to dig up around the roots of ash-trees infested and to destroy white grubs, of any size whatsoever, found in such situations, as it is in the grub state they injure the roots. The perfect beetles should also be dug out at the time they make their appearance as perfect insects and destroyed before they have had time to lay their eggs for another brood the following season.

**INSECT INJURIES.**—*Cotton-caterpillars* (from description probably *Anomis xylinæ*) appeared for the first time in Sussex County, Virginia, stripping the foliage of the cotton-plant. The same insects, with the *boll-worms* (*Heliothis armigera*) were more or less destructive in Chowan, Pitt, Tyrrell, Beaufort, Rowan, Currituck, and Pamlico, North Carolina; in Lexington, Marion, and Marlborough, South Carolina; in Putnam, Stewart, Floyd, Taylor, Muscogee, and Marion, Georgia; in Taylor and Wakulla, Florida; in Chambers, Choctaw, Clinch, Worth, Talladega, and Dallas, Alabama; in Lee, Jasper, Grenada, and Wilkinson, Mississippi; in Tensas, Claiborne, and West Feliciana Parishes, Louisiana; in Brazoria, Blanco, and Cherokee, Texas; in Garland, Arkansas, and in Shelby, Tennessee.

Various preparations of Paris green and other poisons have been used in different portions of the cotton-growing region. In some localities farmers were deterred from using them by fear of casualties to man and beast. In Cherokee County, Texas, false reports were rife of actual injuries, but these soon exploded. Ginners were also afraid to gin poisoned cotton, lest the product of vegetation might contain sufficient poison to be injurious.

*Grasshoppers*, (*Caloptenus femur-rubrun*, &c.) were reported in Carroll County, New Hampshire, as lively till the last of October. In Palo Pinto County, Texas, grasshoppers appeared September 20, and left October 2, destroying all verdure, not even excepting fruit-tree foliage. Tobacco and corn crops were injured by them in Medina, Lorain, and Geauga Counties, Ohio. In Orange County, Indiana, they were destructive

upon all fall crops till they were killed by the severe freeze of October 23. In Redwood County, Minnesota, they were particularly damaging to potatoes, beans, and buckwheat. In Sioux, Harrison, Monona, and Plymouth Counties, Iowa, they injured all the crops. In Clay County, Missouri, and in Smith County, Kansas, they were also mischievous. In Madison County, Nebraska, the prospects of a fine crop this year were greatly depressed by these pests; they were also heard from in Antelope and Nemaha Counties; they were rife in the western part of the State. In San Luis Obispo County, California, they injured potatoes. They were troublesome in Clay County, Dakota, in Lewis and Clarke County, Montana, and in Bonhomme County, Dakota.

*Potato-insects.*—Our correspondents would confer a favor by designating the particular kind of insects depredating upon potatoes. Many of them speak simply of potato-bugs, but it appears sufficiently evident that in most, if not in all, cases the Colorado beetle (*Doryphora decemlineata*) is meant. Injuries are reported in Garland County, Arkansas; in Marion, Brooke, and Tyler, West Virginia; in Anderson and Livingston, Kentucky; in Washington, Franklin, Medina, Lorain, Crawford, Geauga, Hamilton, and Mercer, Ohio; in Calhoun, Oceana, and Livingston, Michigan; in Martin, La Porte, and Ohio, Indiana; in Tazewell, Mason, and Boone, Illinois; in Calumet, Saint Croix, and Washington, Wisconsin; in Kandiyohi and Steele, Minnesota; in Fayette and Audubon Counties, Iowa; in Pettis and Maries, Missouri; and in Clay, Dakota. An insect formerly destructive of potatoes (*Cantharis marginata*) attacked spinach and other garden vegetables in Elk County, Pennsylvania. Paris green is used with increasing effectiveness in abating these nuisances.

Insects designated by the unmeaning term corn-worms (probably *Heliothis armigera*) were mischievous in Waldo, Maine, and in Bandera and San Saba, Texas. Grub-worms (*Lachnosterna* sp.) injured the corn in Bland, Virginia, and in Washington, Wisconsin. The weevil (*Sitophilus oryzae*) infested the corn-crop of Wilkinson, Mississippi.

*Chinch-bugs* (*Micropus* (*Rhyparochromus*) *leucopterus*) are reported as shortening the corn-crops of Gibson, Dearborn, and Ohio, Indiana; and in Pike and Boone, Illinois; in Jasper, Gasconade, Miller, Douglas, Texas, Perry, Phelps, Maries, and Dallas, Missouri; in Labette, Montgomery, Woodson, Wilson, Neosho, and Cherokee, Kansas. Our correspondent in Labette, states that the fourth brood of these insects were destroyed by frost, and inquires whether this will not arrest their reproduction the coming year. The eggs of the chinch-bug have been found by the entomologist in the ground in midwinter awaiting only the warmth of coming spring to hatch them out.

*Cabbage-worms* (*Pieris* sp.) are reported in Wyoming, New York, and in Franklin, Ohio.

*Tobacco-worms* (probably *Macrosila Carolina*) did some damage in Dickson, Tennessee; in Nicholas, Kentucky; in Franklin, Missouri.

Fruit-insects, undesignated, were observed in Marion and Whitfield, Georgia. The apple-crop was affected by core-worms (*Carpocapsa pomonella*) in Harrison, West Virginia. A great variety of insects, names not given, were destructive to crops in Grundy and Montgomery, Tennessee. In the last report notice was taken of the absence of birds from the forests in this State. The correspondence of the Department shows that the pernicious practice of shooting birds has gained ground in the South in the last few years. The great increase of insect depredators may be partly traced to this cause.

# CHEMICAL MEMORANDA.

BY WILLIAM MCMURTRIE, CHEMIST.

**BAT-EXCREMENT.**—During the early part of the month of October this Department received from Messrs. Miller & Taneré, of Huntsville, Alabama, a sample of organic material, which was accompanied with the following communication:

We send you to-day, by express, a small box containing specimen of a deposit found in a cave on the plantation of Mr. B. F. Watkins, in Lauderdale County, Alabama, on the Tennessee River, about forty miles west of Huntsville. The cave has never been thoroughly explored, but is thought to be about two miles in length, with rooms opening on either side of the main entrance. It is inhabited by a countless number of bats, from whose discharges the deposit in question is formed. No correct idea can be formed with regard to the extent of this deposit, but in many places it is found to be fifteen feet deep.

By request of Mr. Watkins we send you this specimen for analysis, as he wishes to ascertain its value as a fertilizer, and the proper ingredients with which to compost it for either cotton or cereals. There is in it also a lump of niter, which also exists in a large quantity. This was worked during the war by the confederacy in the manufacture of saltpeter.

The color of the deposit is dark brown. The material is very light, and seems to consist of small scales, which are probably the remains of insects. This fact, together with the fact that the cave from which it is obtained is inhabited by a large number of bats, may be considered fair evidence in support of the theory advanced with regard to its origin.

The lump accompanying the dark sample, supposed by our correspondent to be niter, cannot be considered as such since it contains no potassa or other alkali of any account, and but a small proportion of nitric acid. On account of the presence of this latter constituent, as well as of the soluble phosphoric acid, it has some agricultural value, and will be found useful in admixture with the other material. When taken from the box it was quite moist, and when cut through, the section presented a white and yellowish mottled appearance. On exposure it dried, forming a tolerably hard mass, which crumbled upon application of slight pressure, and when crushed it was very fine and pulverulent. From the results of analysis given below it seems to be an accumulation of siliceous clay.

The analysis resulted as follows:

Moisture .....	12.800
Organic matter .....	9.700
Silica, insoluble in chlorhydric acid .....	42.290
Silica, soluble in chlorhydric acid .....	9.410
Phosphoric acid, soluble in water .....	0.2277
Phosphoric acid, insoluble in water .....	1.4673
Peroxide of iron .....	0.1169
Alumina .....	19.88
Lime .....	1.6377
Magnesia .....	2.09
Nitric acid .....	0.0823
Sulphuric acid .....	Trace.
Soda .....	Trace.
Carbonic acid .....	Trace.
<hr/>	
	99.7019

The dark-brown material has a greater agricultural value, since it contains a much larger quantity of the constituents which are imme-



diately available for plant-food. It may be used with advantage in the raw state, in favorable quantities, without composting, for either cotton or cereals; but in cases where it may be more convenient for application it may be used with any kind of composting materials whatever.

The analysis of this material gave the following results:

Moisture .....	11.60
Insoluble silica .....	30.81
Soluble silica .....	3.18
Insoluble organic matter { containing 3.72 per cent. of nitro- {	28.687
Soluble organic matter { gen = 4.52 per cent. of ammonia {	10.573
Free ammonia .....	Trace.
Phosphoric acid, soluble in water .....	1.305
Phosphoric acid, insoluble in water .....	1.5016
Peroxide of iron .....	1.428
Alumina .....	3.21
Lime .....	4.11
Magnesia .....	3.11
Soda .....	0.312
Nitric acid .....	0.122

99.9486

**DITAINÉ, NEW SUBSTITUTE FOR QUININE.**—The use of *Eucalyptus globulus* as a substitute for quinine has been quite thoroughly discussed, and now we find another plant which bids fair to make equally as great a stir in the medical world. The plant in question, *Echisiers scolaria*, belongs to the family of the Apocynaceæ, and grows quite abundantly near Luzon, in the province of Bataugar, in the Philippine Islands. Its bark has for some time been employed by the inhabitants of the province as a cure for all kinds of fevers. M. Gruppe extracted from the bark the active principle, which he called *ditainé*, and which has been used in the hospitals in the same manner and the same doses as quinine. It is said to be quite as efficacious as quinine without producing any of its disagreeable effects, and has been found very valuable as a tonic.

**DIGESTIBILITY OF PHOSPHORIC ACID AND LIME BY ANIMALS.**—In the course of some investigations with feeding lambs by Dr. V. Hofmeister, at the royal veterinary school at Dresden, he found that when known quantities of phosphoric acid and lime were administered to lambs and wethers, variable quantities of these substances were digested. He first experimented upon two separate lots of lambs, one lot being fed upon hay and potatoes alone, and another lot fed upon an equal quantity of hay and potatoes, to which was added a known quantity of precipitated phosphate of lime. This course of experiments extended over several months, when it was found that the amount of phosphate of lime digested varied with the amount administered, the phosphoric acid of the former decreasing as the latter was increased. Thus when the lambs were daily fed with 6 grams of the precipitated phosphate of lime, a maximum quantity was digested, but when 9 grams were administered only about one-half of the phosphoric acid was digested. On the other hand, in the latter case the amount of lime digested increased to 86.2 per cent. against 65.6 per cent. under the former conditions.

So also with feeding two-year-old wethers with superphosphate of lime, or the phosphate of lime soluble in water, it was found that when 10 grams of this material, containing 1.95 grams of phosphoric acid and 1.20 grams of lime soluble in water, and 2.036 grams phosphoric acid and 3.90 grams lime insoluble in water, the whole of the soluble portion, together with 4.24 per cent. of the phosphoric acid and 23.7 per cent. of the lime of the insoluble portion, was digested. But when 20 grams of the superphosphate were daily administered,

only 64.7 per cent. were digested. Dr. Hofmeister, therefore, concludes that when small quantities of the phosphate of lime are added to hay and potatoes, about one-half of the phosphoric acid and about 42 per cent. of the lime is digested. But when a larger quantity is administered, the digestibility decreases about 20 per cent., only about 30 per cent. being then taken up; while the amount of lime which is digested is increased to 65 per cent. against 23 per cent. taken up in the previous case. What would be the influence of a continuation of this treatment upon the subsequent health of the animals has not been determined.

**MANGANESE IN BEECH-LEAVES.**—J. A. Wanklyn has observed in the course of some investigations upon the value of different leaves for use as tea, that beech-leaves yield 20.8 per cent. of extract, which, upon incineration, yields 2.44 parts of ash, the latter containing so much manganese as to cause it, in the dry state, to show a decided green color, and upon treatment with water to give the characteristic red solution of permanganate. Mr. Wanklyn suggests that on account of the great fragrance of the extract it might possibly be used as a beverage.

**EFFECT OF STREET-GAS UPON VEGETATION.**—By a series of experiments upon the effect of gas upon different species of trees by Messrs. Späth and Meyer in the botanical gardens in Berlin, it has been found that when the gas is brought into contact with the roots of trees for considerable length of time, in quantities however small, though some trees are able to withstand this influence longer than others, yet all must finally succumb, and will at last sicken and die. The influence is much less active during the winter, when the rootlets have become woody, than during the period of growth in the summer, when they are young and tender, and are therefore in a better condition to absorb the gas.

**FREEZING WINES.**—A very important industry bids fair to arise in the way of improving the quality and richness of wines and other alcoholic fluids by submitting them to very low temperature. It has been found that alcoholic liquids containing 50 per cent. of absolute alcohol become viscous at  $-30^{\circ}\text{C.}$  ( $= -22^{\circ}\text{F.}$ ) When taken from a wooden vessel, (to avoid contact with cold metal or glass,) rum and cognac thus cooled to  $-40^{\circ}$  to  $-50^{\circ}\text{C.}$  ( $= -40^{\circ}$  to  $-58^{\circ}\text{F.}$ ) have the curious property of producing but a slight sensation of cold upon different organs. If cooled to  $-71^{\circ}\text{C.}$  ( $= -96^{\circ}\text{F.}$ ) they are said to produce an effect similar to soup which is a little too hot, but when placed upon the skin they slowly cauterize without burning. Sparkling wines subjected to this treatment increase about 60 cc. per bottle, while non-sparkling wines increase only about 15 cc. One-half to two-thirds of ordinary wines may be removed by freezing, leaving a liquid which may be dirty at first, but becomes clear by standing. They become richer in alcohol and extractive matters; their aroma as well as their color is improved, and they lose by coagulation and precipitation all the albuminoids and salts, which form an abundant magma. M. Melsens, who has worked up the matter, states that the ice which separates, if submitted to centrifugal force or pressure, is entirely free from alcohol, and that 40 per cent. of ice may be removed from Bourgogne wines.

With well-organized work and suitable apparatus this method may be successfully applied to the amelioration of wines, and may in some cases even take the place of distillation. Since freezing preserves and enriches the wines, and heating protects them from maladies, it is probable that a combination of these two methods of treatment will remove the difficulties of bad years.

**NITRIFICATION OF SOILS.**—M. Schloesing, who has devoted a great



deal of attention to a consideration of the value of nitrogen and nitrates in agriculture, has lately published the results of some very interesting investigations with regard to the formation of nitric acid in soils under different conditions. He finds that the slow combustion of organic matter in the soil is, in many cases, almost independent of the amount of oxygen in the confined air, but that it varies considerably according to the temperature. Thus, at an average temperature of  $24^{\circ}$  C. ( $75^{\circ}$  F.,) more carbonic acid was formed than at an average of  $16^{\circ}$  C., ( $60^{\circ}.8$  F.,) that formed in the latter case being not more than one-half the quantity produced in the former.

The amount of oxygen in the confined air had but a slight effect in the formation of nitric acid, but it was found that the formation varied with different amounts of moisture in the soils, and that it was much more variable in dry than in very moist soils. For example, in the case of nearly dry soil the production of nitric acid varied from 95.7 to 246.6 milligrams per kilogram of earth; while in the case of earth which had absorbed a maximum amount of moisture, (24 per cent.,) the production varied from 199 to 225 milligrams of nitric acid per kilogram of earth.

In his experiments upon the reduction of nitrates in the soil, M. Schloesing's results indicate that not one-fifth the amount of ammonia was formed which should have been produced from the nitrogen of the nitrates present, and he concludes, from the facts observed, that there is always a loss of nitrogen in the decomposition of organic matter, whatever may be the cause.

RESPIRATION BY SUBMERGED AQUATIC VEGETATION.—In experiments with regard to this subject by Schutzenberger and Quinquaud, upon yeast and *Elodea canadensis*, they found that the former showed no other phenomenon than that of absorption of oxygen with production of carbonic acid. The extent of this absorption is not affected by light, but varies considerably according to the temperature at which it takes place. At  $10^{\circ}$  C. ( $50^{\circ}$  F.) it is almost inappreciable; it increases until a temperature of  $50^{\circ}$  C. ( $122^{\circ}$  F.) is reached, but at the temperature of  $60^{\circ}$  C. it is entirely stopped.

Light seems to have no effect in the respiration of *Elodea canadensis*, the absorption being the same in the light as in the dark, but it differs from yeast in that during the diurnal respiration it gives off free oxygen. If a large quantity of the plant be immersed in a tolerably small quantity of water, and submitted to direct sunlight for an hour or two, numerous bubbles of gas will be liberated, and a supersaturated liquid will be obtained which may contain as much as 20 cubic centimeters of oxygen per liter. The manner of absorption is the same for both plants, but in case of the *Elodea* the absorption is about ten times less.

EUCALYPTUS GLOBULUS, its use in improving the salubrity of marshy and malarial districts.—The many very interesting accounts which have been published with regard to the *Eucalyptus globulus* do not seem to have exposed all of its values. And we find in *Comptes Rendus* of Oct. 6 a note presented to the French Academy of Sciences by M. Gimbert, in which he describes another value equally as great as those with which all are so familiar. From reports received from various reliable sources, it seems to have been determined that in localities where the *Eucalyptus* flourishes there has been a complete disappearance of intermittent fevers. "A tree," says the author, "springing up with incredible rapidity, capable of absorbing from the soil ten times its weight of water in twenty-four hours, and giving to the atmosphere antiseptic



camphorated emanations, should play a very important part in improving the health of malarious districts." It has the property of absorbing directly and rapidly the water of shallow marshes, thus preventing the fermentations which are produced, and paralyzing the animal miasma proceeding from them which might arise from them. The predictions with this regard, which were made in 1869, have in all cases been realized. The author furnishes a few of the numerous results, which are very interesting.

The English were the first to experiment in their sanitary plantations in Cape Colony, where they were eminently successful. Two or three years were found sufficient to change the climatic conditions, and the aspect of the malarious districts of their possessions.

Some years ago the Algerians took occasion to spread the *Eucalyptus* throughout the French possessions in Africa, and the following are some of the results obtained, as communicated by M. Trottier:

"About 20 miles from Alger, at Pondouk," he says, "I owned a property situated near the river Hamyze, the emanations from which produced intermittent fever among the farmers and their servants every year. In the spring of 1867 I planted upon this farm 13,000 plants of the *Eucalyptus globulus*. In July of that year, the season in which the fevers appear, the farmers were completely free from them. In the mean time the trees had scarcely attained a height of more than 8 or 10 feet. Since that time the settled population has been entirely free from fevers."

Fourteen thousand *Eucalyptus* trees were planted upon the farm of Ben Machydlin, in the vicinity of Constantine. It has for several years past been noted for its insalubrity, being surrounded with marshes throughout the entire year. The trouble entirely disappeared and the soil became perfectly dry in five years. The atmosphere is constantly charged with aromatic vapors, the farmers are no longer troubled with disease, and their children are bright with health and vigor.

The operations of the manufactory of Gué in Constantine were rendered wholly impracticable during the summer on account of the pestilential emanations from the marshes with which it was surrounded. M. Saulier conceived and put into practice the idea of planting a large number of *Eucalyptus* trees in these marshes, and in three years about twelve and a half acres of the marshy soil were converted into a magnificent park. The water completely disappeared, and the health of the workmen has since been in good condition.

In consequence of the large grove of *Eucalyptus globulus* on the farm of Maison-Carrée, which is situated in a district in which the inhabitants formerly succumbed to the malaria, similar hygienic revolutions have taken place.

It is stated by land-owners in Cuba that there also the paludal and telluric diseases have disappeared from the malarial districts where the *Eucalyptus* has been cultivated.

According to Ramel, Australia is very healthy where the *Eucalyptus* flourishes, and unhealthy where the tree is not found.

On the banks of the Var, near the entrance of a railroad-bridge, is situated a garrison-house, near which earth-works were thrown up to dam the river in order to build the bridge. The malaria arising from it made it necessary to change the guard each year. Two years ago M. Villard, the engineer in charge of that section of the road, planted 40 trees in the vicinity of the building, and since that time this post has been the most healthy in the country.

These evidences fully establish the fact that the *Eucalyptus globulus*

has a good effect in preventing the spread of malarial diseases, and that it may serve decidedly practical purposes in this particular. Throughout our entire South and Southwest many valuable enterprises have been wholly impracticable from causes stated above, and if the examples thus set before us were followed throughout the South, there is no doubt that many of the dismal, swampy, and marshy districts, hitherto entirely worthless, may be transformed into beautiful, pleasant, and healthy sections.

## BOTANICAL NOTES.

BY GEORGE VASEY, BOTANIST.

**BROMUS SCHRADERI, OR AUSTRALIAN OATS.**—Mr. C. W. Stewart, of Montgomery County, Texas, sends to the Department a very interesting report of trials by him of various kinds of grasses. He enumerates Australian oats, or *Bromus schraderi*, and ordinary Fescue grass, evidently under the impression that they are distinct grasses. Of the latter he says:

The ordinary Fescue grass which I find, (as Dr. Lincecum, of Washington County, Texas, long since mentioned to be a native plant, growing wild near the Navasota River,) is an annual. Of this I was able to sow 2 bushels. After being "set," say the second year, it can be grazed from 1st February until seeding time, when it resets itself fully, thus relieving one of the care and labor of replanting. It is a most valuable winter grass.

There is evidently a great deal of confusion about this grass, or these grasses. In the Monthly Report for July it was stated that the *Bromus schraderi*, Kunth., was the *Bromus unioides*, Willd.; and that, although it has been called Australian grass, was not an Australian but an American grass. It has had several synonyms, among them that of *Ceratachloa australis*, Spreng.; the specific name *australis* meaning southern, and referring to its locality in the Southern States, and not in Australia. By a confusion in this respect it probably came to be called Australian grass or Australian oats. The name "Fescue grass" properly belongs to some species of *Festuca*, which is very nearly related to *Bromus*.

In the Patent-Office Report for 1853, page 212, is published a statement from General Iverson, of Columbus, Ga., concerning a grass which he was cultivating, and which he calls *Ceratachloa breviaristata*. This name was applied by Hooker to a grass collected by Douglass in Oregon, which has since been described as *Bromus breviaristatus* by Mr. Watson in the "Botany" of Clarence King's "Exploration," who states that it is common in the meadows of Nevada, and probably extends from Washington Territory to New Mexico. This suggests the thought that perhaps even *Bromus breviaristatus* may be identical with *Bromus schraderi*, alias *Bromus unioides*, but further investigation is necessary.

**AQUILEGIA CHYSANTHA.**—In the grounds of the Department during the past summer one very attractive object was a clump of *Aquilegia chrysantha*, Gray, raised from seed brought by Dr. Palmer from Arizona. The plants grow about 4 feet high, branch freely, and when in flower present a mass of golden-yellow blossoms, which it is a pleasure to look upon. It is very similiar in form to the sky-blue aquilegia (*A. cœrulea*) of the Rocky Mountains, but besides the contrast in color it blooms more freely and continues to furnish a succession of flowers during July and August. The species was discovered more than twenty years ago



by Mr. Geo. Thurber, (of the American Agriculturist,) and was called *A. leptocera* by Dr. Gray. Recent observation of the plant in a growing state convinced Dr. Gray that it was a new species, and he has accordingly redescribed it under the name given above.

The American Agriculturist for September gives a figure of the flower with an account of its history. It is perfectly hardy, and is well worthy of cultivation. Indeed, it has already made a good start in that direction among English florists. The Gardener's Chronicle (London) for October contains a flattering notice of it, with some details of its history and nomenclature. Whoever possesses this species, with the sky-blue aquilegia, (*A. cærulea*), and the native scarlet one, *A. canadensis*, will have the choicest of the aquilegias.

**PURPLE CONE-FLOWER, (*Echinacea purpurea*).**—A specimen of this plant in cultivation from Illinois presented some features which commend it to attention for the garden. Although somewhat coarse in foliage, its large flower-heads terminating the naked peduncles are quite showy from the dark-purple, almost black, conical center and the numerous (10 to 15) light-purple pendant rays. These rays are about 2 inches long by  $\frac{1}{4}$  inch wide. The plant is vigorous and hardy, and is worthy of trial in the flower-garden.

**FERTILIZATION OF FLOWERS.**—This subject has received much attention of late, and our knowledge has been much extended by the researches of various observers. A recent article by Mr. A. W. Bennett, in the Popular Science Review, gives an interesting résumé of recent observations, from which we gather the following items:

Every person who has carefully examined the subject is aware that a great portion of flowers are cross-fertilized, that is, the female organs are fertilized by the action of pollen, not from the same flower, but from other flowers of the same kind in the vicinity, and that the most common agencies in producing this effect are, the wind and insects.

A very good and familiar example of flowers fertilized by the agency of the wind is furnished by the common hazel, (this refers to the English hazel, but will apply equally well to our American species,) which flowers from January till the early part of March, even when the weather is very cold and when there are scarcely any insects on the wing. The flowers of the hazel are of two kinds, male and female. The male flowers constitute the familiar catkins which drop off and disappear before the leaves make their appearance.

The catkins are generally in bunches of from two to four, every catkin containing, on an average, perhaps from one hundred to one hundred and twenty flowers. Each of these male flowers consists of a simple scale-like tract, inclosing from eight to twelve anthers, each of which discharges, when ripe, a cloud of innumerable pollen-grains; so that the number of these grains in any single catkin must be prodigious. The female flowers are found on the same branches as the catkins, and are also in clusters of from two to six, (the future nuts,) and are of equally simple structure with the male flowers, being formed of single pistils, appearing like slender crimson threads protruding from scaly buds. If one of these crimson threads is placed under an ordinary pocket-lens, it will generally be found to have on its surface several apparently minute particles of dust, which, on further examination, are found to be pollen-grains which have been blown from the male flowers. Each individual pollen-grain has the power of emitting a pollen-tube which penetrates the stigma, reaches the ovary, and by the fertilization of the ovule induces the formation of the embryo, and thus the development of the ovule into the fertile nut. Since the only means by which the pollen can be conveyed from the male to the female flower is the agency of the wind, and it is only quite by chance that any of the grains can reach their destination, the reason is obvious of the enormous amount of pollen with which the catkins of the hazel are furnished. In some plants, whose fertilization is effected in the same manner, the quantity of pollen is still greater, and this is especially the case in the *coniferae*, or fir-tribe. American travelers have described how the water of some of their lakes near the shore is covered at certain seasons by a thick stratum of a sulphur-like substance, the pollen blown from the neighboring pine woods. Whether the female flowers of the hazel are fertilized from the catkins on the same or on a different bush is a point still in dispute.



There is little doubt that the wind exerts a great influence upon the fertilization of some of our cereal crops, though botanists are not unanimous on this point. It would appear from recent researches on this subject (see Monthly Report for May and June) that some of the grains are subject to close-fertilization, and others to cross-fertilization, in either case the occurrence of violent storms of wind or rain at the season of flowering might operate injuriously upon the fertilization, and thus justify the anxiety which farmers are said to possess as to the occurrence of favorable weather at this season.

In the majority of flowers, however, the structure of the pollen, or the arrangement relative to one another of the pistil and stamens, is such that fertilization could not be effected by the wind alone. Sometimes the pollen-grains themselves are too large and heavy to be thus conveyed, or they are united together by fine threads or even in dense masses; or the position of the stigmatic portion of the pistil is evidently not adapted for the pollen to reach it in this way, and nature then employs as the agent in fertilization insects or other small animals. This opportunity is afforded by the visits of insects to the flowers in search of the honey, or nectar, which forms an important portion of the food of many classes. The mode of attraction to the flowers which serve them as food is mainly two-fold, scent and color.

Nature is always economical of her resources, and accordingly we do not generally find that strong scent and brilliant variegation of color are bestowed on the same flower. Those which are most prized for the power or delicacy of their scent, have, as a rule, flowers either inconspicuous or, if large and conspicuous, of uniform unvariegated color; as, for instance, the mignonette, primrose, sweet violet, lily of the valley, honey-suckle, linden, and many others, while the most brilliantly variegated flowers are comparatively or quite scentless, as the fritillary, *Pelargonium*, *Tropæolum*, *Mimulus*, *Ranunculus*, pansy, &c.

One of the largest of scented flowers, the evening primrose, blossoming only in the night, is fertilized by night-flying moths, which probably require the large sulphur-yellow flowers, as well as the scent, to guide them from a distance in the dim light. American naturalists state that many of the largest and most gorgeous flowers of the western continent, such as the *Bignonias*, or trumpet-flowers, are fertilized by humming-birds. Another mode in which insects assist in the fertilization of flowers is by the voluntary deportation of pollen; and this is chiefly effected by *Hymenoptera* belonging to the class *Aphidæ*, which includes the hive and humble-bees that build nests in which they store up large quantities of food for their young while in the larva state. This bee-bread, as it is termed, with which the thighs of homeward-bound bees are seen to be heavily laden, consists almost entirely of innumerable pollen-grains robbed from the flowers, which the little depredators may be seen to despoil in a very scientific manner. Though the greater quantity of this pollen is carried home, small quantities of it are unavoidably left behind here and there on the stigmas of the flowers, quite sufficient to ensure the fertilization of the ovules.

We mentioned at the outset that though the large majority of flowers are cross-fertilized, yet there are exceptions to the rule. There are not a few flowers which never or scarcely ever completely open their petals so as to allow either the entrance of an insect or the escape of the pollen.

In many plants belonging to widely separated natural orders, either intermixed with the ordinary conspicuous flowers, or appearing at a different time of the year, there are peculiarly-shaped flowers, called *cleistogamous*, which are self-fertilized. Among the natural orders in which these flowers have been found are *Violaceæ*, *Cistaceæ*, *Oralidaceæ*, *Balsaminæ*, *Polygalaceæ*, *Caryophyllaceæ*, *Leguminosæ*, *Campanulaceæ*, *Convolvulaceæ*, *Acanthaceæ*, *Labiata*, and *Commelyneæ*. The two species of *Impatiens* or Touch-me-not, which grow wild in this country, *Impatiens Noli-me-tangere*, and *I. parviflora*, as well as a North American species, *I. fulva*, which is fully naturalized in some places, have closed, imperfect, self-fertilized flowers intermixed with the showy yellow ones.

The most easily observed instances are, however, in the case of our common wild violets, the sweet violet, (*Viola odorata*.) or the various forms of the dog violet, (*Viola canina*.) The existence of these flowers in *Viola* was known as long ago as the time of Linnæus, who states that the flowers of *Viola mirabilis* produced in the spring are often barren, while the later ones, which have no corolla, are fertile. The *cleistogamous* flowers of the violet appear long after those that are familiar in the spring, and may be found in abundance in July and August, very small, but still not difficult to make out. These closed summer flowers produce an abundance of seed. In accordance with the ordinary practice of economy by nature, the amount of pollen in the *cleistogamous* flowers is generally very much less than in the open ones, since it has very little chance of being wasted.

More detailed examination of these closed flowers in different plants will doubtless yield interesting and important results.

## MICROSCOPIC OBSERVATIONS.

BY THOMAS TAYLOR.

During the last two years the Department has received numerous letters from orange-growers in Florida calling its attention to a new form of disease that has appeared on their orange-trees. The branches become covered, more or less, with a rust-like substance which ultimately destroys the affected parts.

Mr. J. H. Gates, of Pilatka, Fla., under date of November 27, 1872, writes to the Commissioner of Agriculture as follows:

Inclosed are a few orange-leaves, and also an orange having a dark skin, which was the case with nearly half of the crop of some of our growers last season. They are not so much discolored this season. The coloring matter, whatever it may be, does not injure the quality of the fruit, but it affects its market-value. Also, please find inclosed three branches of an orange-tree having a rusty appearance, and in some places blistered. I have trees which have lost all their tops, apparently from this cause. Any information relative to the cause or cure of this disease will be gladly received by myself and neighbors.

In a second communication from the same writer, dated December 31, 1872, further information is given in relation to the so-called rust of orange-trees. He says:

It first appeared in this section (Saint John's River, near Pilatka) about three years ago. The young buds were first attacked. The disease next spread to the young wood, and then gradually over the tree. We observe that the disease is more general on the low-lands, and it generally appears on transplanted stumps having buds from one to three years of age. I have not known any bearing-trees to have rust on their bark. Some persons in this vicinity think that the rust is caused by a worm; others by cocci; while others suppose that the black coloring-matter on the skin of the orange is silica. Any light thrown on this subject by the scientific men of your Department will prove of great value to us.

The following letter received by the Department from Mr. F. L. Darcy will not only prove of interest to orange-cultivators, but also to those who desire to investigate this disease. The writer first refers to insect-disease as being its probable cause, then to the dark stains on oranges, and lastly to the rust, so called, on the branches.

BUENA VISTA, ORANGE MILLS POST-OFFICE, FLA.,

January 5, 1873.

SIR: In reference to the disease of the orange-trees I have to say that I have noticed it for many years, more or less, in every orange-grove that I have visited, but never in such quantity as to be at all alarming. In my own groves I have not for twenty years observed more than three or four trees affected by it. Those were budded trees—sweet buds on the wild or sour orange stock. These trees were inclosed in a small fowl-yard about 20 feet square, boarded up 5 feet high, with a small house inclosed. The trees outside of the inclosure within 20 feet of the former grew well, and having been set out and budded at the same time of the first, were all planted in 1836, and have continued perfectly healthy. After three years' trial I found that the four trees within the inclosure were still unhealthy. Every season they threw out young, vigorous branches which grew till they were 6 to 8 inches long, when they would commence dying back from the extreme ends, and the bark in most instances would become rough and of a yellowish hue, while the trees from year to year remained about the same size. I concluded to remove the fence and house from around them. This was done three years ago. The trees, with one exception, are now as vigorous growers and as healthy as their neighbors, while the fourth is gradually improving. This disease, I think, is produced principally by an insect. The bark of the tree is punctured and the eggs deposited there. In the case of the four trees mentioned I am of opinion that they first became diseased from being too closely confined and not having free circulation of air during the heat of summer; the great stimulating quality of the fowl-house manure.



may also have had a bad effect on them; for soon after removing the inclosure and manure they commenced gradually to improve, and are now nearly restored.

A very common error of beginners in orange-culture consists in burying the tree too deeply in the ground, covering up from 4 to 8 inches of the collar of the stock, which should be above ground. In this condition the tree may live, but will grow very slowly, making very little new wood for years. When the buried collar has thrown out artificial roots the trees may revive, and in the mean time will continue to throw out vigorous sprouts, but they will die back each season, much to the disappointment of the impatient cultivator. This is termed "damping off." When this is the case it is easily remedied by lifting the tree, or by bringing the natural roots to the surface. Drainage is all-important for orange-trees. They will not flourish when the roots remain in stagnant water.

The disease known as the rust has affected the orange-trees since 1864 in this section of the State, the consideration of which is of far more importance than the black substance, &c., on the trees alluded to. The "rust" may be caused by an insect or a fungus.

I will send you some samples of the oranges having dark stains, and also a few having clear skins, taken from the same tree, hoping that some of your scientists may be able to inform me what are the causes of the respective diseases, and, if possible, to suggest to me a remedy.

Respectfully, your obedient servant,

F. L. DARCY.

Mr. J. A. Whitner, of Mellonville, Fla., states that "the rust appears either on high or low lands, more frequently on the low or flat lands, which in this locality are imperfectly drained. The trees affected with this disease are always checked in growth, but rarely die. They recover under high cultivation with judicious manuring, but bear small and imperfect fruit, with a tough, spotted rind, and a hard, insipid pulp. I send you, as requested, by this mail, specimens of twigs affected by this fungus, healthy and unhealthy, taken from the same tree; also specimens injured by bark-lice. These insects are very destructive and widely spread in this vicinity. They are the cause of the fungi or leaf smut generally confined to young trees."

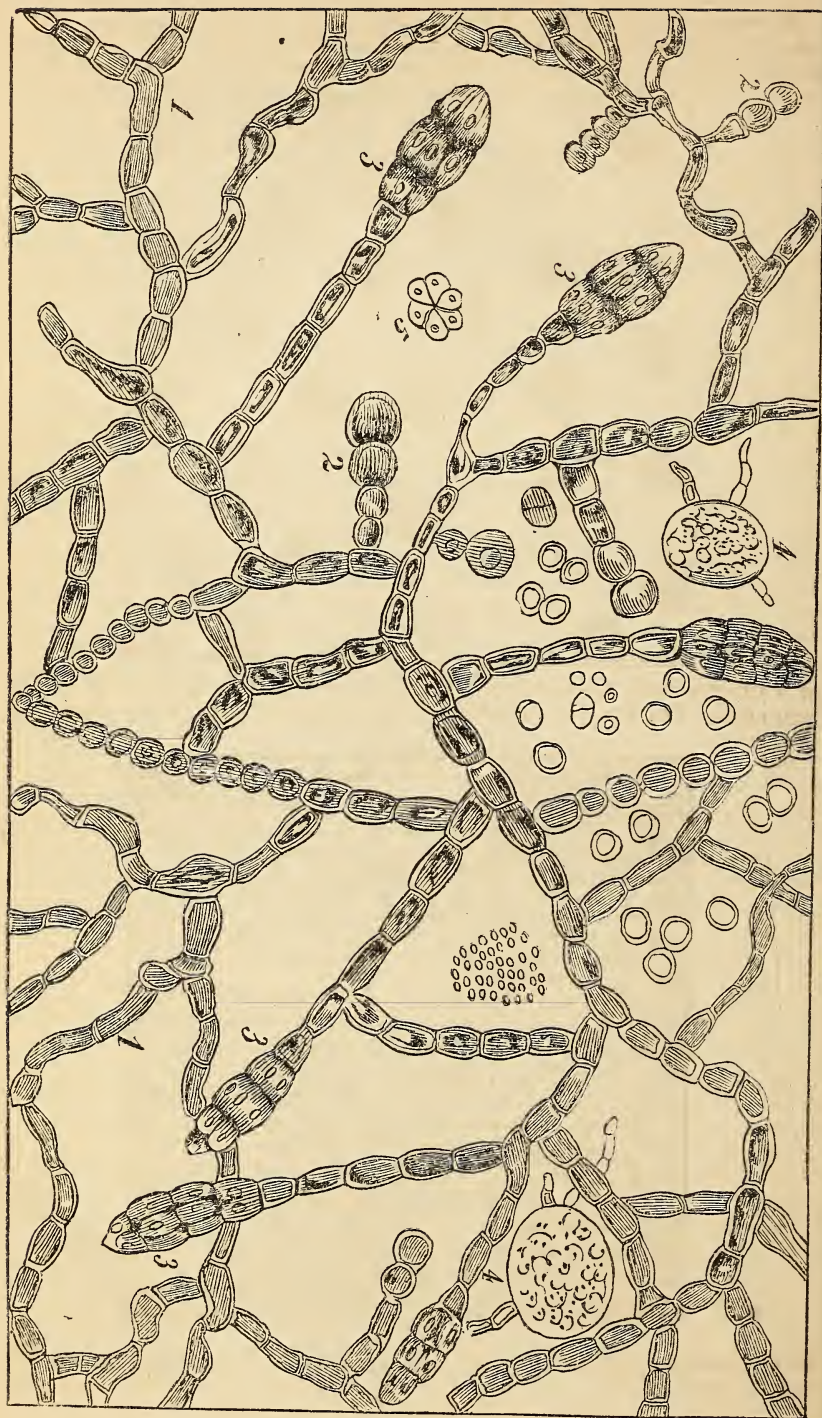
The Department has received several communications from orange-tree cultivators of Texas in relation to orange blight, but thus far it would seem that the rust blight is unknown to them, as the following from Mr. Sidney Scudder, mayor of Galveston, Texas, will show:

Your communication of November 27, 1872, was duly received. Careful inquiry of orange-tree growers and personal examinations of numbers of trees in this county have developed nothing in the shape of disease among them at this time. The excessive drought of the past summer diminished the crop considerably and caused the fruit to become unusually sour and unpalatable. This was, however, effectually remedied by loosening the earth under the trees and spreading ashes or pulverized soil, or charcoal around them. The Rev. P. C. Tucker was particularly successful with this remedy applied to his orange-trees this fall.

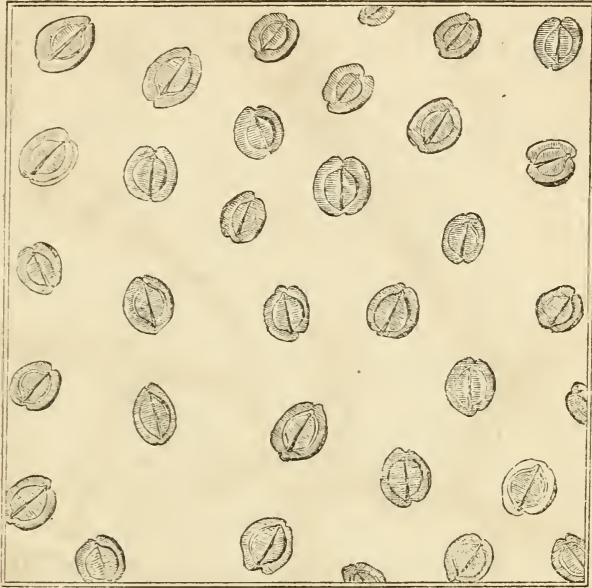
On being supplied with specimens of the so-called "rust," blackened leaves, branches, and fruit, I made a series of observations and experiments to ascertain, if possible, the character of the various phases of the fungus and affected parts, of the plant, so as to be able to point out cause and effect. I removed portions of the rust from the branches, subjected them to a power of about 30 diameters, and viewed them by reflected light. No fungoid forms were visible.

I next treated a portion of the rust with caustic potash, in which the so-called rust proved partially soluble. The insoluble portions were washed with pure water until all soluble substances were removed. I then subjected several portions of the insoluble parts to a power of about 100 diameters, when they were seen to consist of cellular, fibrous, and woody matters, and were wholly free from fungoid forms. I next subjected a portion of the "rust" to the action of alcohol of 95 per cent. proof. The alcohol became tinged of a brown color. On pouring a portion of the liquid into water a white precipitate was formed, showing the presence of a resin.





A very close inspection of the "rust" under a power of about 5 diameters exhibited, in some cases, a slight gloss on the surface. At this stage I became convinced that the "rust" was probably only an effect



of a fungus, and consequently not the cause of the dying back of the branches. On the development of these facts, I suggested that Mr.



Gates should make a thorough search for specimens of "rust" exhibiting a slight translucency. In due time specimens were received from him



slightly translucent, portions of which were held over the flame of a spirit-lamp, when instant resinous ignition took place. Its smoke had the odor of burning shellac. The "rust," so called, proved to be composed of albuminous and resinous matter combined with vegetable cellular tissue, earthy matter, &c., unimportant to consider in this case. My attention was next directed to the investigation of the black matter on the leaves, branches, and fruit. I removed a portion of the black matter from a leaf. It appeared as if composed of black, granular matter, cemented with flour-paste, and formed into thin sheets of the thickness of tissue-paper. When dried it may be cut to any form desired. Sometimes it appears as a fine black powder scattered over the leaf, and is frequently found in quantity at the base of orange-buds. On placing a portion of the black matter under a power of about 100 diameters, it is seen to consist of a branched and jointed mycelium or spawn of a fungus. After making many observations, under a power of about 600 diameters, the fungus, in its various stages, was clearly defined. I, Fig. 1, represents its mycelium growth; 2 2 its budding cells, which terminate in fruit-cells; see 3, 3, 3, 3, bearing spores which germinate; 4 4 are fungoid aggregations which throw out filaments; their relation to the black mycelium is not represented thus far; 5 represents what appears to be a cross-section of the asci or fruit, when perfectly formed and cut through its greatest diameter crosswise. The surface of the leaf is generally covered with these germinating-spores when the black mycelium is on the leaf; being colorless they are invisible. Frequently Vandyke colored cells are seen on the leaf. They consist of disjointed mycelium. To the naked eye the fungoid spores, &c., appear black, but under the microscope they appear of a Vandyke brown, with the exceptions noted. It is known to mycologists as black mycelium. Berkley says that of late years the black mildews have raged to such an extent in the Azores and Ceylon as to threaten the complete annihilation of the orange and coffee plantations, and the ravages have been scarcely less among the olives in some parts of Europe. It is impossible that light can have its proper effect through such a medium on the tissues of the leaves. It would be as rational to expect that plants would thrive under a brown bell-glass as that vegetation should not be impaired when the greater part of the plant is covered with a thick, dark felt. The mildews are often accompanied or preceded by a coccus, and I believe that the first stage of growth of most *Antennariae* is more frequently observed where the leaves have been soiled with honey-dew.\*

It has long been observed that a black powdery substance always forms on the leaves, buds, and the fruit of the orange-tree and some other plants when attacked by the "mealy-bug" and orange-scale insects. The plants are doubtless punctured by these pests, causing a flow of sap from the ruptured parts, which probably forms a nidus for the black mycelium to vegetate in, spreading over the whole tree, blackening and destroying it. The skin or epidermis has its peculiar functions to perform, and, if covered, its healthy action will be impeded. All molds and blights are plants of a very low organization, and live in this predacious way; but many are flowering herbs, and even shrubs. One of the latter is the mistletoe, the seed of which germinates on the boughs of the tree where it falls, or is left by birds, and forming roots, which penetrate the bark, the plant ingrafts itself into the wood, to which it

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\* Honey-dew is a sweet, saccharine substance found on the leaves of trees and other plants in small drops like dew. Two substances have been called by this name, one secreted from the plants, and the other deposited by a small insect.



becomes united as firmly as a natural branch to its parent stem. Indeed, the parasite lives just as if it were a branch of the tree on which it grows and feeds.

Botanists represent that the green bark of plants is furnished with breathing pores as well as the under surface of the leaves, and in some cases the upper surface. In this case I determined to ascertain their relative number on the green bark and leaves of the orange-plant. With this object in view a portion of the bark was removed with a sharp knife, and treated with hot caustic potash, after which the epidermis was easily removed. When mounted and viewed with a power of about 100 diameters the numerous pores were seen and could be counted. A portion of the skin no larger than a fly-spot contained about twelve of these breathing pores. I next experimented with the orange-leaf to ascertain the true character of its upper and under surfaces. A leaf was placed in a strong solution of nitro-muriatic acid, which bleached it slightly and rendered it somewhat transparent by oxidation, without softening the albuminoids which bind the surfaces together. The next step was to wash the leaf in water to free it from acids. With a circular steel punch a portion of the leaf was cut out and placed for a few minutes in a capsule containing a strong solution of chlorinated soda, after which it was placed in pure water when the epidermis of the under surface of the leaf floated off. I floated the disc thus removed on to a microscopic slide, using a camel-hair brush to assist in the manipulation, and mounted it with gum and disc in the usual way. The surface was found to be almost destitute of cellular structure. The stomates are best seen under a power of about 600 diameters. (See Fig. 2.) The green bark and under-surface of the leaves contain about 64,000 of these pores to the square inch of surface. The thick disc should be floated on to glass as above, and its superfluous moisture removed with clean blotting-paper. Its exposed surface should be placed face downward. With a point the epidermis may be removed, which place in water and float on to a glass slide as before described. It will represent the upper surface of the leaf. On examination with the microscope it exhibits cellular structure only and seems to be wholly destitute of stomates. (See Fig. 3.) The fleshy portion on the third slide should have a drop of thick gum placed on it and be covered with a glass disc. When viewed under a high power it becomes an object of much interest. The branching vascular bundles will be distinctly seen, resembling in some respects the arteries and veins of the human body. A careful examination will show that these are also covered with a very fine lace-work of cells under and over them, and interspersed among the latter will be seen a vast assemblage of translucent dottings, each having an opening across it corresponding to those of the stomates under which they were situated before dissection. The structure of the leaf taken as a whole indicates the great necessity of cleanliness and high culture; for the more complicated the organic structure of the plant is, the greater will be the number of its economic products, and the more apt are abortions in the form of fruit to be produced in the case of neglected culture or unfavorable climatic conditions. In plants there are "milk-vessels, turpentine, oil-receptacles, and the like, which form canals or cavities between or among the cells and are filled with the particular product of the plant." Not so with the lower forms of fungi. Their roots may grow in profusion, although frequently torn to pieces, because of their simple form of structure and habits. A single cell of mycelium will germinate, bud, or reproduce its kind as perfectly as will a spore of its fruit. In this case the lower forms of fungi have a decided

advantage over the higher organized plants. Climatic conditions wholly unfavorable to the growth of the latter are highly favorable to that of the former.

Probably the true remedies for the evils complained of consist in thorough drainage, proper culture of the soil, moderate manuring, and destroying the cocci and fungi by frequent washings with weak alkaline solutions, such as potash, soda, or ammonia.

Orange-plants confined within glass structures suffer a great deal from insects and fungi, and the remedy in use in such cases consists in thorough washing with soap and water, and the free use of a soft brush. Frequent washings are necessary.

At page 115 of the annual report of the Department of Agriculture for 1855 is published an interesting description of the habits of the orange-scale insect, by the entomologist of the Department, in which he proposes to syringe the plants affected with a solution of guano. Its ammonia destroys the young cocci as they emerge from the shelter of the parent scale, while the droppings enrich the soil.

As the growth of the black fungus seems so intimately connected with the presence of the orange-scale cocci, I would recommend that the insects be first destroyed by the washes proposed, and then the fungus and rust will disappear from the plants with a rapidity in proportion to the attention bestowed upon their cultivation, provided the climatic conditions are favorable to their growth.

## FOREIGN DEMAND FOR WHEAT.

We have repeatedly shown it to be the policy of nations to supply their own people with wheat and other bread equivalents, and that few fail to do so, and fewer still undertake as a permanent policy the production of cereals for exportation. Among these Russia and the United States are the most prominent, and France and Germany always export something, and often partially balance exports by subsequent imports. Great Britain is the only regular and extensive purchaser. That the reader may study the wants of Great Britain, and means of supply, the following table is given, compiled from the official records of British imports.

*A statement showing the sources of supply of wheat to Great Britain, as presented in official tables of imports, being the total imports of wheat and flour (in equivalent weight of grain) of fifteen years.*

Year.	United States.	Russia.	Germany.	France.	British America.	Other countries.	Total.
	<i>Cwt.</i>	<i>Cwt.</i>	<i>Cwt.</i>	<i>Cwt.</i>	<i>Cwt.</i>	<i>Cwt.</i>	<i>Cwt.</i>
1858 .....	4, 782, 785	2, 653, 883	4, 210, 117	5, 581, 064	702, 838	5, 270, 254	23, 201, 941
1859 .....	430, 504	3, 837, 454	4, 561, 521	8, 124, 978	170, 821	4, 372, 456	21, 497, 734
1860 .....	9, 315, 125	5, 639, 971	6, 904, 819	4, 583, 412	1, 310, 652	4, 067, 947	31, 841, 926
1861 .....	15, 610, 472	4, 540, 483	6, 658, 462	1, 359, 882	3, 387, 949	6, 089, 457	37, 646, 705
1862 .....	21, 765, 087	5, 755, 785	7, 930, 849	1, 961, 835	5, 118, 698	7, 510, 140	50, 042, 394
1863 .....	11, 869, 179	4, 538, 934	5, 728, 626	1, 857, 403	3, 198, 187	3, 695, 563	30, 887, 892
1864 .....	10, 077, 431	5, 129, 410	6, 842, 721	2, 854, 421	1, 831, 897	2, 101, 320	28, 837, 203
1865 .....	1, 498, 579	8, 093, 989	7, 224, 371	6, 058, 902	528, 456	2, 439, 255	25, 843, 552
1866 .....	986, 239	9, 181, 432	6, 801, 657	8, 023, 530	59, 601	4, 319, 230	29, 371, 679
1867 .....	5, 091, 733	14, 166, 794	7, 873, 216	2, 140, 832	835, 006	9, 029, 199	39, 136, 780
1868 .....	6, 753, 389	10, 055, 338	7, 224, 597	846, 863	798, 505	10, 827, 353	36, 506, 045
1869 .....	15, 320, 257	9, 187, 236	7, 546, 688	2, 153, 350	3, 396, 511	6, 843, 730	44, 447, 772
1870 .....	15, 057, 236	10, 326, 844	4, 487, 773	1, 060, 120	3, 402, 690	2, 571, 452	36, 906, 115
1871 .....	15, 625, 331	15, 689, 943	4, 258, 823	182, 262	3, 782, 776	4, 823, 092	44, 362, 227
1872 .....	9, 634, 349	17, 938, 977	5, 183, 601	4, 553, 781	2, 157, 170	8, 145, 018	47, 612, 896

This makes a total of 523,141,861 cwt. of wheat, (or its equivalent in flour,) imported into Great Britain in the past fifteen years. This is a yearly average of 35,209,487 cwt., or 65,724,319 bushels of sixty pounds each. The requirements of the past five years have exceeded this average, though in 1870 by a small excess. The amount for 1872 is about eighty-eight million bushels. Many have supposed that Russia is the heaviest contributor to these supplies, but these official figures show, when subjected to analysis, that the United States furnishes the largest proportion, the total for fifteen years being 143,817,686 cwt., or 27 per cent. of all, while the proportion for Russia is 24 per cent., or 126,756,477 cwt. Germany (exclusive of the duchies up to 1860) contributes 17 per cent., (93,437,841 cwt.,) and France 9 per cent., (51,342,638 cwt.) British America has sent 5 per cent. These prominent contributions (with fractions of percentage omitted) make 84 per cent., leaving but 16 to all other sources of supply.

The absurdity of the theory that there is a surplus of wheat produced is strongly shown in the fact that only the United States and Russia are reliable in a series of years for any surplus whatever, that their excess is nearly all required to make up the deficiency of a single country, and that there never is any other outlet for such excess. Estimates have been rife, in commercial quarters, of a requirement of two hundred millions of bushels by nations having deficient wheat-crops. It is utterly impossible to find such a surplus, if necessary, or indeed much more than half of it. If official and other accounts are true the aggregate wheat exports of each nation of the continent of Europe, minus its imports, will scarcely exceed the exports of this country, though there will be exports from Russia, although her accustomed home supply may be short, and replaced in part by coarser grains.

The following table gives the official figures for nine months of 1873, with the cost in dollars, and the cost per bushel:

*Quantities and declared value of British imports of wheat and wheat-flour for the nine months ending September 30, 1873.*

	Importations.		Declared value.		United States gold value.		Value per cwt.	
	1872.	1873.	1872.	1873.	1872.	1873.	1872.	1873.
Wheat from—	<i>Cwt.</i>	<i>Cwt.</i>						
Russia .....	12,953,710	7,319,200	£7,553,856	£4,577,332	\$37,919,430	\$22,856,660	\$2 92	\$3 13
Denmark .....	153,196	257,184	100,919	173,478	504,595	867,390	3 29	3 33
Germany .....	2,740,997	1,412,575	1,840,650	1,002,320	9,203,250	5,011,600	3 36	3 55
France .....	743,560	1,169,193	480,377	746,592	2,401,885	3,734,460	3 23	3 18
Austrian territories .....	42,232	15,009	25,229	10,239	126,145	51,195	2 99	3 41
Turkey, Wallachia, and Moldavia .....	727,543	279,974	357,914	162,310	1,939,570	831,550	2 66	2 97
Egypt .....	1,777,045	1,136,748	881,505	624,436	4,407,525	3,122,180	2 48	2 74
United States .....	5,344,619	13,065,441	3,437,847	8,479,601	16,189,235	42,398,005	3 14	3 24
Chili .....	1,170,359	1,317,840	767,768	824,258	3,838,840	4,121,290	3 28	3 12
British North America .....	637,662	2,013,042	415,093	1,321,974	2,075,405	6,609,870	3 25	3 28
Other countries .....	1,076,982	2,773,199	717,628	1,875,000	3,588,140	9,375,000	3 33	3 38
Wheat-meal and flour from—								
Germany .....	700,581	463,707	644,283	455,741	3,221,415	2,278,705	4 60	4 89
France .....	508,668	1,577,774	455,029	1,504,746	2,275,145	7,523,730	4 47	4 77
United States .....	345,192	936,392	277,524	823,143	1,387,620	4,115,715	4 02	4 39
British North America .....	199,238	318,995	173,918	282,434	869,590	1,412,170	4 36	4 42
Other countries .....	664,447	1,352,216	679,967	1,304,046	3,399,835	6,520,230	5 12	4 82



## FACTS FROM VARIOUS SOURCES.

**THE WHEAT EXPERIMENTS OF LAWES.**—The experiments of Mr. J. B. Lawes, of Rothamstead, England, in growing wheat continuously on the same plots, one unmanured, one treated with farm-yard manure, others with commercial fertilizers, are well known, having been continued now twenty-two years. The following table gives the production for each of the past eleven years, the average for that period and also the average for twenty-two years:

*Bushels of dressed corn per acre.*

Harvests.	No manure. Plot 3.	Farm-yard ma- nure. Plot 2.	Artificial manures.			Means of plots 7, 8, and 9.	Means of plots 3, 2, 7, 8, and 9.
			Plot 7.	Plot 8.	Plot 9.		
1863 .....	17½	44	53½	55½	55½	54½	33½
1864 .....	16½	40	45½	49½	51	49	35½
1865 .....	13½	37½	40½	43½	44	42½	31
1866 .....	12½	33½	30	32½	32½	31½	25½
1867 .....	8½	27½	22½	30½	29½	27½	21½
1868 .....	16½	41½	39½	46½	47½	44½	34½
1869 .....	14½	38½	28½	31½	39	34½	23½
1870 .....	15	36½	40	45½	45½	43½	31½
1871 .....	9½	39	22	27½	34½	28½	25½
1872 .....	10½	32½	29	35½	40½	35½	26½
1873 .....	11½	26½	22	27½	35½	28½	*22½
Average for eleven years, 1863-'73 .....	13½	36	34	39	41½	38½	†29½
Average for twenty-two years, 1852-'73..	14½	35½	34½	37½	37	36½	†28½

*Weight per bushel of dressed corn.*

Harvests.	No manure. Plot 3.	Farm-yard ma- nure. Plot 2.	Artificial manures.			Means of plots 7, 8, and 9.	Means of plots 3, 2, 7, 8, and 9.
			Plot 7.	Plot 8.	Plot 9.		
1863 .....	<i>Lbs.</i> 62.7	<i>Lbs.</i> 63.1	<i>Lbs.</i> 62.5	<i>Lbs.</i> 62.3	<i>Lbs.</i> 62.1	<i>Lbs.</i> 62.3	<i>Lbs.</i> 62.7
1864 .....	62.0	62.5	63.1	63.5	62.6	63.1	62.5
1865 .....	60.6	61.5	61.6	61.4	61.1	61.4	61.2
1866 .....	61.3	61.7	61.0	60.1	60.6	60.6	61.2
1867 .....	54.1	61.4	61.0	60.7	59.9	60.5	59.4
1868 .....	61.0	61.6	61.1	62.7	61.1	61.4	61.3
1869 .....	56.1	56.9	57.4	57.2	57.1	57.2	56.8
1870 .....	61.7	63.4	63.3	63.0	62.7	63.2	62.9
1871 .....	54.8	60.0	56.6	57.7	58.6	57.6	57.5
1872 .....	50.0	60.7	60.2	60.4	60.0	60.2	60.0
1873 .....	57.0	57.1	58.1	56.9	57.1	57.0	*57.4
Average for eleven years, 1863-'73 .....	59.3	61.0	60.4	60.5	60.3	60.4	†60.2
Average for twenty-two years, 1852-'73..	57.6	60.0	59.2	59.0	58.4	58.9	†58.8

\* Equal to 21 bushels at 61 pounds per bushel. † Equal to 23½ bushels at 61 pounds per bushel.  
‡ Equal to 27½ bushels at 61 pounds per bushel.

Mr. Lawes gives the following statement in explanation of the peculiarities of the season, with deductions from the tabulation above presented:

In my letter published in the Times of September 29, last year, I stated that the season of 1870-71 was, for artificial manures, much less favorable, but for farm-yard manures considerably more favorable than the average; and that, consequently, the calculated average from my produce, which is considerably influenced by the results obtained by artificial manures, would probably give a figure too low for the average produce of the country at large in 1871; while, on the other hand, as the season of 1871-72 was, compared with the average, more unfavorable for farm-yard than for artificial manures, the figure derived from the experimental results of 1872 would probably be too high for the average yield of the country in that year. A correction was accordingly made, and the imports of the year have shown that the estimate of the average crop of the country so arrived at must have been extremely near to the truth.

In the present season the unmanured produce is higher than in 1872, and considerably higher than in 1871. On the other hand, reducing the produce in each case to bushels of 61 pounds, that by farm-yard manure is nearly 7 bushels per acre lower than in 1872, and nearly 13 bushels lower than in 1871; and the mean produce of the three artificially manured plots is more than 8 bushels below that of last year, but almost identical with that of 1871.

Taking the mean of the produce without manure, with farm-yard manure, and of the three artificial manures taken as one, we have  $22\frac{3}{4}$  bushels of grain per acre, of 57.4 pounds per bushel, which, reckoned at 61 pounds per bushel, represents only 21 bushels. This is from 4 to 5 bushels less than the average taken in the same way last year, and nearly 7 bushels less than the average of twenty-two years. In fact the produce by farm-yard manure and by the various artificial manures agrees very closely with that under the same conditions in the very bad season of 1867.

Reduced to 61 pounds per bushel, the average produce of the selected plots in the experimental wheat-field in 1873 is about 24 per cent. below the average of twenty-two years. Much of this great deficiency is due to the fact that there was, in all, about double the average fall of rain during the four months of October, November, December, and January, the effect of which would be to wash beyond the reach of the roots a large amount of the nitrogenous manure which had been applied in the autumn. It is established that that most important and costly constituent of manure, nitrogen, especially when applied in the soluble form of ammonia, is largely converted into nitrates in the soil, and is, in that condition, washed away into the drains or the subsoil when there is an excess of rain. The loss of effect thus arising is strikingly illustrated by a comparison of the produce of the two plots, No. 7 and No. 9. Both received the same amount of nitrogen per acre, which was applied as ammonia salts in the autumn to plot 7, and as nitrate of soda in the spring to plot 9. The result was that while the autumn-sown ammonia salts yielded 22 bushels, the spring-sown nitrates yielded nearly 33 bushels. Again, another plot which received the same amount of ammonia salts as plot 7, but applied in the spring instead of the autumn, yielded nearly 33 bushels.

The loss of the nitrogen of manure by winter drainage would be the greatest where guano, ammonia salts, or other very soluble nitrogenous manure was sown in the autumn, less where farm-yard manures are employed, and still less where wheat was grown after.

**FORESTRY.**—An “international congress of land and forest culturists” held in Vienna in September, presided over by the Austrian minister of agriculture, passed resolutions petitioning the Austrian government to take measures for inaugurating international treaties with other European states intended to secure the protection of birds useful in agriculture; another series, declaring the lack of scientific basis for land and forest culture, and the necessity of official publications of exact statistical comparative data illustrating the status and progress of each country in these departments of industry; and a third relative to the necessity of action toward forest preservation, as follows:

1. We recognize the fact that, in order to effectually check the continually increasing devastation of the forests which is being carried on, international agreements are needed, especially in relation to the preservation and proper cultivation (for the end in view) of those forests lying at the sources and along the courses of the great rivers, since it is known that, through their irrational destruction, the results are great decrease of the volume of water, causing detriment to trade and commerce, the filling up of the river's bed with sand, caving in of the banks, and inundations of agricultural lands along its course.

2. We further recognize it to be the mutual duty of all civilized lands to preserve

and to cultivate all such forests as are of vital importance for the well-being—agricultural and otherwise—of the land, such as those on sandy coasts, on the sides and crowns as well as on the steep declivities of mountains, on the sea-coasts and other exposed places, and that international principles should be laid down, to which the owners of such protecting or "guardian forests" be subject, thus to preserve the land from damage.

1. We recognize further that we have not at present a sufficient knowledge of the evils (disturbances in nature) which are caused by the devastation of the forests, and therefore that the efforts of legislators should be directed to causing exact data to be gathered relating thereto.

It was stated, in the course of the proceedings, that the Rhine, the Oder, the Elbe, and other European rivers have lower water-marks than formerly; at Altenbruch, in Hanover, ten Hamburg feet lower in 1857 than a half century before; that part of the kingdom of Wurtemberg had been reduced to comparative barrenness by the felling of trees; that droughts were increasing in severity in Hungary, a fact popularly attributed to the deforestation of the country.

The case of the region near Trieste, on the Adriatic, was particularly referred to. It was stated that five hundred years ago a heavy forest covered that region, which was destroyed by the Venetians for the purpose of securing pile-timbers and lumber for commerce, and that after the trees were felled the unprotected soil was washed away by storms, and the whole face of the country became a dreary waste. In August last we passed through that region, and noted it as one of the most desolate views presented by any country. The surface far away from the coast was completely covered with ledges and rough bowlders, was almost destitute of soil, and the heat radiated from the rocks was intolerable. In parts of this broad belt some millions of olive-trees have been planted by the Austrian government, the soil for the purpose being transported in baskets in some places. It is stated that the rains, which twenty-five years ago ceased to fall here, are again appearing to refresh the scene.

Similar statements were made relative to local ameliorations by forest-planting on the coasts of Germany, in Upper Egypt, and at Ismaila, and in other countries.

**TRANS-MISSOURI IRRIGATING CONVENTION.**—Delegates from States and Territories west of the Missouri met in convention at Denver on the 21st of October, to take preliminary steps toward concerted action, by interested States and Territories and the national Government, for constructing a general system of irrigating works for the whole western arid region. Kansas, Nebraska, Colorado, Utah, New Mexico, and Wyoming were represented by delegates; Arizona, Montana, and Dakota by letters from their respective governors; and Nevada by a letter from Senator J. P. Jones. R. W. Furnas, governor of Nebraska, presided.

Hon. S. H. Elbert, governor of Colorado, stated in his opening address that the meridian of Fort Kearney, the ninety-ninth west from Greenwich, constitutes a dividing line in the physical characteristics of the continent, west of which is found about half the area of the United States, and except a tract along the Pacific coast and a small area of river valleys, it is without sufficient rain to be available for agriculture, though exceedingly productive with irrigation. Two great parallel mountain chains, the Sierra Nevada and the Sierra Madre, traversing the entire domain from South to North, eight hundred miles in average breadth of intervening plateau, cut and gorged by great rivers and divided into hydrographic basins of great extent by transverse mountain-chains; the great plains descending by the gentlest slopes from the bases of the



Sierra Madre eastward to the prairie lands of the Missouri; rivers and smaller streams sweeping down from the mountain flanks and threading valley and plain, as arteries of the human system, constitute the grand physical outlines of this arid region. He stated that in France irrigated lands rent at \$21 per acre, and unirrigated at \$16. In 1856, 247,000 acres had been brought under irrigation in that country, and since then the quantity had been rapidly increasing. The irrigated lands of Granada, Mercia and Valencia, amounting to 500,000 acres, are considered the gardens of Spain.

Mr. R. A. Cameron, of Larimer County, Colorado, stated that in his section irrigation has cost \$7 per acre; in Utah, \$13; in Lombardy, \$16. On an irrigated farm near Greeley, a farmer with an outlay of \$48, and the work of one pair of hands, raised, in one season, produce which yielded him \$4,000.

Mr. A. M. Musser reported that in Utah there are now about 140,000 acres under irrigation, and claimed an increase of rain as one of the results. Up to 1865, over 277 canals and ditches had been constructed for irrigation; of these the aggregate length was 1,043½ miles, and the total cost \$1,776,939; average cost per mile, \$1,695. The amount expended on canals and dams in the fiscal year ending October, 1867, was \$248,000. The number of acres irrigated that year, 100,000; acres of wheat, 48,000; average yield per acre 17½ bushels, (one-sixth of the crop being lost by the ravages of locusts and grasshoppers;) of barley, 6,300, average yield 18 bushels, loss one-fourth; of oats, 1,900, average yield 20 bushels, loss one-third; of corn, 7,900, average yield 15 bushels, loss one-fourth; of potatoes, 6,300, average yield 100 bushels, loss one-fourth; of meadows, 30,000, average yield 1¾ tons, loss one-eighth. Of 25 canals representing all sections of the Territory, the average dimensions are, length, 6½ miles; width at bottom, 6½ feet; depth of water, 15½ inches; fall, per mile, 23½ feet; average number of acres watered by each, 1,638. Mr. Musser said:

Our reclaimed alkali lands, of which we had many thousand acres, are among our richest, strongest, and consequently most remunerative soils. The mode of reclamation is simply by leaching the land by elaborate irrigation and by repeated plowing; thus exposing it to the direct influence of segregating elements which carry off the volatile and objectionable ingredients. When Salt Lake City was first founded the water capacity for irrigating purposes did not exceed 800 or 900 acres. Now between 4,000 and 5,000 acres are successfully irrigated. At first the land was arid and thirsty. Subsequent irrigation saturated and settled the soil and thus slaked much of its early thirst. The increase of rain-fall, no doubt superinduced by agriculture, occupation, and cultivation, and the numerous fruit and shade trees, like so many mulch-agencies, neutralizing the drying effects of the sun's rays and prevailing winds, has very largely contributed to cool and moisten the soil and to lessen the necessity for frequent and elaborate watering. After successive years of watering the upper or bench lands, we discover that the lower lands, including much arable and about all the grasslands, received about all the water they needed through the percolating course of the waste waters alone.

Mr. Benito Baco, of San Miguel County, New Mexico, stated as evidence of the necessity of irrigation, that in his county over 150,000 sheep were lost in one season simply for the want of water.

Mr. F. J. Stanton expressed the opinion that irrigation even in Iowa and Illinois would insure 25 or 30 bushels of wheat to the acre, instead of 12½, and that "every foot water travels in a ditch it acquires fertilization and food-property for vegetation." He stated that the annual deposit from the Mississippi had been estimated at 23,188,053,892 cubic feet of solid matter, exclusive of the coarse sand and gravel transported by the current; also that the Rhine annually carries down 1,973,433 cubic feet. He estimated the reclaimable area in Colorado 25,000,000

acres. Others made much lower estimates. Governor Elbert claimed that Colorado alone has a water-supply for irrigating 6,000,000 acres—an area equal to that which in the days of the Ptolemies, in Egypt, supplied food for a population of 8,000,000.

The convention unanimously recognized the necessity for aid by the National Government, as the only authority having jurisdiction and capable of giving unity and efficiency to a system permeating several States and Territories, and as the principal landholder and party to be benefited.

The convention, after deliberating two days, in extended day and night sessions, adopted unanimously a memorial to Congress, reciting that the arid region of the United States, embracing over one-third of the area of the country, or more than one million square miles, in the Territories of New Mexico, Arizona, Colorado, Wyoming, Utah, Idaho, and Montana, the State of Nevada, and large portions of the States of Oregon, California, Nebraska, Kansas, and Texas, and of the Territories of Washington and Dakota, is generally unfit for profitable cultivation without irrigation; that the water supply is abundant for reclaiming millions of acres; that a system of irrigation suited to the wants of this region is too expensive for individuals, associations, or Territorial or State governments; that vast areas of land must long remain unsold and unavailable for agriculture without such a system of internal improvement; that the small areas available for settlement by present means of irrigation are now nearly exhausted; that such a system might be incidentally useful in driving the machinery of thousands of gold and silver mines now unworked for lack of water; and, therefore, praying for the passage of a law embodying the following general provisions:

First. To grant to the several States and Territories named in the preamble to this memorial one-half of all the arid lands not mineral within their borders, said lands, or the proceeds thereof, to be devoted to the construction of irrigating canals and reservoirs for the reclamation of said arid and waste lands.

Second. That the construction and maintenance of irrigating canals and reservoirs shall be under the exclusive control and direction of the Territory or State, as sole owner thereof, under such laws, rules, and regulations as the legislature thereof shall from time to time provide.

Third. That the Territorial and State legislatures shall have power to make all needful rules and regulations, and take all needful steps for the proper construction and maintenance of such canals, and that such power shall include the power to provide, by laws for the issuing of the bonds of the Territory or State, for the construction of such canals.

Fourth. That the proceeds of said lands herein granted shall be kept as an exclusive fund by the Territory or State, first, for the payment of the principal and interest of all bonds so issued as aforesaid; second, that any balance remaining after the payment of the bonds so issued as aforesaid shall be used in the maintenance of said canals, or the construction of other canals, as the legislature of said Territory or State shall from time to time by law direct.

Fifth. That any lands within said Territory or State which shall be filed on under the provisions of the pre-emption and homestead laws of the United States, after the passage of this act, shall be subject to the operation of this act, if the said lands shall be brought under irrigation by the construction of said canals.

Sixth. That the bonds so donated to the several States and Territories herein named, and the remainder of the public domain therein belonging to the General Government, shall be disposed of under revised and more strict pre-emption and homestead laws than are now in force, and that no title shall issue until the claimant shall be a *bona-fide* actual settler upon the land claimed.

**MANUFACTURE OF PAPER FROM HOP-STALKS.**—M. Jourdeil, of the department of the Côte d'Or, in France, has recently submitted to a congress of paper-makers of that country an invention, or rather a series of inventions, for separating and using the textile material which envelops the stalk of the hop, in the manufacture of paper. The experiments with this new fiber have already reached some remarkable results,



and great confidence is indulged that a discovery has been made which will prove of great interest and value to agriculture as well as to the paper-making industry.

**RICE IN MARYLAND.**—A farmer of Wicomico County, Maryland, (eastern shore,) reports that from one quart of rice, planted in deep, black soil, he raised twenty-four quarts, weighing twenty-eight pounds. It was planted about the middle of April, in rows 18 inches apart, and cut October 27. Single grains produced from five to twenty-five stalks, from  $3\frac{1}{2}$  to 5 feet high.

**NOTES ON BERMUDA GRASS (*Cynodon dactylon*) IN THE SOUTH.**—Dr. St. Julian Ravenel, of South Carolina, states that by the use of nitrates and alkalies in solution he produced hay from Bermuda grass at the rate of sixteen tons to the acre.

Planters at the South have considered this grass a pest, but in the present condition of affairs the old notions are being revised and the grass considered a blessing on some of the needy plantations. The great objection to it has been that it is hard to eradicate; nevertheless, at all times its reliability for a hay-crop and for grazing in the hot climate of the South has been well understood. Dr. Howard, of Georgia, an authority on grasses at the South, thinks that where Bermuda grass has thoroughly taken possession of the soil it will force the owner to raise live stock or abandon the land; and that if the worn soil is ever to be restored it will be by sheep and Bermuda grass, or grass of similar characteristics. In passing, it may be in place to refer to Dr. Howard's opinion of Bermuda grass as expressed in one of the annual reports of the then Bureau of Agriculture:

It will live on land so poor as to be incapable of supporting other valuable grasses, though its value is in proportion to the fertility of the soil. It seems to be determined that below the mountainous parts of the Southern States, if stock be kept away from Bermuda grass during the summer and autumn, although the ends of the grass may be nipped by frost, that there will be sufficient grass underneath to feed stock during the winter. This being the case, it must stand unrivaled as a grazing-grass in the Southern States, taking into the account the whole year, both summer and winter. On very rich land it grows tall enough to be made into hay, and the hay is of the best quality.

The same writer quite recently published the statement that there are thousands of acres of land well set in Bermuda grass in the middle counties of Georgia; that the cotton-planters, who are wholly indifferent to stock-raising, still detest the grass because it is hard to kill, and interferes with their staple. He says that for spring, summer, and autumn grazing he has seen nothing equal to it in Old England, New England, or the West; if cut in August, it gives very good winter-grazing, horses, cattle, sheep, and hogs all being fond of it. Mr. Howard has so thorough a faith in the excellencies of this grass that he asks the question, "Why should men go West when they can accomplish such results at the South?"

Bermuda grass is propagated by roots and not by seeds. The smallest fragment of root will grow with a slight covering of earth. A single shoot will sometimes run 10 feet or more in a single season on rich land, each point putting out roots. An agricultural journal of Alabama recommends the following mode of planting this grass:

Break the land well and harrow up fine, then cut your Bermuda sod into small bits, say one inch square. Drop these bits over the ground 3 or 4 feet apart and roll down level with a heavy roller. If your sod is scarce, you may make your pieces much smaller than an inch square; every root with an eye in it will grow if put into the ground. In cases where no roller is at hand, the dropper of the sod may make all right by treading upon each bit as he drops it. It is always best to start Bermuda in land



not too poor; if in good condition, the grass will keep it so, and it spreads and covers the ground much more rapidly. If you cannot plow your pasture-land, you may still seed it to Bermuda by simply digging small holes (a blow with a grub-hoe will answer) and dropping the seed into them. It will spread over land that has never been plowed, though with less rapidity, of course. Bermuda grass cannot stand any great amount of shading; hence the pasture should be pretty clear of trees.

**WHITE SCHÖNEN OATS.**—A farmer of Coos County, Oreg., reports that he sowed two quarts of white Schönen oats on 19 rods of ground, and gathered 485 pounds, or at the rate of 113 bushels per acre, although about two rods of the sowing lodged and was badly cut up by rabbits. On a particular spot of one square rod the yield was 30 pounds, or at the rate of 133 bushels per acre. The uniform height of the stalks was  $6\frac{1}{2}$  feet, with heads from 18 to 20 inches long. The yield was double that of the common varieties.

**ADAMS' EARLY CORN.**—A correspondent of Powhatan County, Va., says that this is decidedly the best garden-corn he ever planted. He intends next season to plant it as a field-corn, with the expectation of getting corn-meal by the 1st of September. This year he planted April 22, and gathered August 15, when it was hard enough to grind. While it bears, generally, not more than two ears to the stalk, the ears are large and well filled, and seem to be less subject to the attack of the worm which usually infests the early varieties.

**SWEDISH TURNIPS.**—A farmer in Washington Territory reports that from seed obtained from the Department he raised Swedish turnips of very superior quality, the largest of which weighed from 26 to 30 pounds. The summer was unusually dry, but he succeeded by frequently watering the beds after transplanting.

**AGRICULTURE IN INDIA.**—Mr. W. R. Robertson recently delivered an address at the British Museum, Madras, which represents the agriculture practiced in India as of a very primitive and superficial character. The only implement used in working the soil is a very imperfect one, passing under the name of plow, which, instead of turning over the surface, leaves it in its original position, and seldom stirs it to a depth greater than 4 inches, in consequence of which only insufficient nutriment is available for plants, and the effects of prevalent droughts are rendered unnecessarily disastrous. For the same reason crops are easily prostrated by storms. Scarcely anything is done in the way of keeping up the fertility of the soil by the use of manure or other fertilizers. The crops being of a low, unimproved order, possess a degree of native hardness by which they will survive a considerable amount of unfavorable weather and of hard usage; but they are very poor in quality and the yield per acre is exceedingly meager, the seed being stunted and the quantity of husk out of all proportion to that of grain or seed. In the Madras presidency, out of more than 20,000,000 acres devoted to food-grains or plants, less than 25,000 are under wheat, and less than 30,000 under sugar-cane. "The ryot (Indian farmer) cannot, on his exhausted upper soil, grow the higher order of crops unless he improves his practice; this is why all the attempts to improve cotton, tobacco, and Carolina paddy (rice) cultivation, by distributing good seed over the country, have not met with satisfactory results. A high order of plants, like a high order of animals, demands favorable circumstances." Mr. Robertson thinks that, with proper cultivation, wheat could be grown extensively, and sugar-cane on the greater portion of the area under cultivation in the presidency. The condition of live stock is represented to be extremely wretched. There are over 7,000,000 cattle and over

6,000,000 sheep, for which neither pasture nor fodder food is provided. "By far the greater number of live stock of the presidency are kept, during two-thirds of the year, just above the starvation point. The result of such management is that disease is seldom absent from the herds and flocks of the ryot, producing, at times, frightful loss."

**JUTE AND RAMIE IN LOUISIANA.**—Mr. E. Le Franc, president of the Southern Ramie Planting Association of New Orleans, La., writes as follows to the Department in regard to recent experiments with jute, and incidentally refers to ramie:

I have the pleasure to inform you of the success of our jute experiment conducted on an adequate scale. To find out the best time for planting, we put in seed at intervals from April to July. All plantings up to the end of June did well; that of a later period failed to attain the average height, which is here 6 feet—in rich land 8. Manual labor, such as that employed in the jute industry of the East Indies, could not be employed here, because too high-priced and unskilled. We have treated the jute by machinery. Our ramie machinery, recently improved, cleans the jute perfectly in its green state. It gives a crude but neat product which, being rotted, is a beautiful and lustrous fiber. Jute culture cannot fail to be profitable, inasmuch as it requires small capital. The following is a statement of approximate cost:

Cultivation, per acre.....	\$5 00
Cutting, decortication, and manufacture.....	15 00
Implements and interest on capital.....	5 00
	<hr/>
	25 00

Average yield per acre, on common land, 1,500 pounds.

Offered price for the crude fiber, 4 cents per pound; for rotted, 8 cents.

Of course the crude fiber would cost less to the planter; being the direct product from the machine, it would save at least \$5 per acre for manipulation by the rotting process. The raw fiber is a new element for rope manufacture and other coarse industries. It is very strong, and has all the natural qualities of its native condition. We believe that as a material for cordage, in place of common Manila at 9 and 10 cents, it ought to bring at least 6 and 7 cents, and save millions of importation. At all events, we can now proclaim as easy and feasible, jute culture in America. It depends upon the planters to extend it. Ramie, as well as jute, is gaining ground; the mechanical problem is solved. Hemp and flax can also be cleaned by the machinery adapted to ramie and jute.

Having noticed in one of the agricultural reports that cotton, surrounded by a belt of jute, was protected thereby from attacks of caterpillars, I made the experiment, and found the statement to be correct. There were no worms in the field, although situated in lowlands of the suburbs of New Orleans, while some adjacent plantations were visited by the insect. I have also observed that no flies or butterflies ever go to the jute flower.

**STATISTICS OF MONTGOMERY COUNTY, IOWA.**—The rapid progress of western settlement can be illustrated by facts from almost any county beyond the Mississippi. The official census of Montgomery County, Iowa, for 1873, gives the following results: Acres of land improved, 67,890; products of 1872, in bushels: wheat, 229,632; corn, 1,647,893; oats, 287,915; barley, 11,019; pounds of wool, 7,024. The returns of corresponding items in the same county, in 1869, for the United States census, were as follows: Acres of improved land, 30,284; bushels of wheat, 59,712; of corn, 323,168; of oats, 37,393; pounds of wool, 18,492. No barley was reported for 1869. By comparing the two series, it appears that, within the short space of four years, the quantity of land improved was more than doubled, and, within three years, the production increased, of wheat, nearly four-fold; of corn, more than five-fold; and of oats, more than seven-fold. On the other hand, the production of wool fell off 62 per cent. The census for 1873 makes the number of inhabitants 8,602.

**CONSUMPTION OF COTTON.**—M. Ott-Trümpler, in his annual report of cotton deliveries (from ports to the interior) for consumption in Eu-



rope for the year ending October 1, 1873, makes the total number of bales 5,219,000; of which 3,335,000 bales were distributed in England; and 1,884,000 on the Continent. The English supply was received, 1,654,000 bales from America, 737,000 from India, 509,000 from Brazil, 306,000 from Egypt, and 129,000 from other countries; the continental, 669,000 bales from America, 795,000 from India, 144,000 from Brazil, 87,000 from Egypt, and 189,000 from other countries. He reports the annual supply of the past twelve years as follows:

Year.	England.	Continent.	Total.
	<i>Bales.</i>	<i>Bales.</i>	<i>Bales.</i>
1872-'73.....	3,335,000	1,884,000	5,219,000
1871-'72.....	3,132,000	1,641,000	4,773,000
1870-'71.....	3,223,000	2,046,000	5,268,000
1869-'70.....	2,760,000	1,627,000	4,387,000
1868-'69.....	2,587,000	1,916,000	4,503,000
1867-'68.....	2,822,000	1,782,000	4,604,000
1866-'67.....	2,414,000	1,733,000	4,147,000
1865-'66.....	2,319,000	1,616,000	3,935,000
1864-'65.....	1,873,000	1,182,000	3,055,000
1863-'64.....	1,565,000	1,033,000	2,598,000
1862-'63.....	1,332,000	814,000	2,146,000
1861-'62.....	1,217,000	776,000	1,993,000

IRRIGATION IN INDIA.—The “imperial budget statement” for the government of India, for 1873-'74, besides an estimate of £2,354,000 (exclusive of the appropriations for roads and civil buildings) for ordinary public works, includes a proposed grant of £3,878,000 for extraordinary public works. Of this, £1,226,000 are intended for carrying forward canals of irrigation already in process of construction, that is, “the canals from the Jumna, near Agra, the Lower Ganges Canal, the canal from the river Soane, and the completion of the canal-system in the deltas of the Kistna and the Godavery, the improvement of the Western Jumna Canal, and the Moota project in the Bombay Presidency.”

The canal revenue superintendent of the Cuttack district, in Bengal, reports to the irrigation branch of the public works department of Bengal upon irrigation in cotton-culture as follows:

In the Cuttack district only two varieties of cotton are grown, viz, the *haldiya* and the *achna*; the former is, generally speaking, the cotton of the hills and rainy season; the latter of the plains and dry season. It will be convenient to describe the mode of cultivating them separately. The *haldiya* variety is sown in June and July, and picked in October and November. Though generally grown in the Gurjeets, where newly reclaimed jungle-land is largely available and best suiting the crop, it is also occasionally met with in the delta of the Mugulbundi, but in very small quantities, and grown either on land reclaimed from jungle or else within the precincts of the ryot's own homesteads. It is but rarely grown on the ordinary *dofasli* or *biyali* lands. But little care is given, I believe, to its cultivation, the earth being turned over as for rice, and the plant left to itself with the exception of an occasional weeding.

The *achna* variety is sown in November, December, and January on the *dofasli* or *biyali* lands, and is picked in May, June, and July. The seed used is the seed of the *haldiya* variety, and the ordinary mode of cultivation is as follows: The land is allowed to lie fallow for the whole of the rainy season, the rotation of crops being as follows: (1) *biyali*, followed by *biri*, *mug*, *linseed*, or other similar crop; (2) fallow; (3) cotton. The land is plowed at the end of November, in December, or at the beginning of January, as may happen to suit the rain-fall, the closing of the canals, or the ryot's convenience, and is brought into the ordinary conditions of garden-soils. Whatever manure the ryot has to spare (which is generally so little and of such a quality as to be of but little benefit) he puts down. The soil is then worked up into ridges, and the seed dibbled in by hand, five or six seeds in each place at intervals along the ridges of about a foot. To prepare the soil water is required; and, as a rule, cotton is not grown



in any place where there is not a supply of water of some kind. The soil is moist below where the seed is put down, though dry above.

When the plants are about half a foot high and there has been no rain, the first watering is given, and this is continued at intervals of about fifteen days until the middle or end of May, when the crop is in full flower. The first and last waterings are the most important of all. The method of watering is peculiar. A small channel is made from the source of the water-supply to the highest point in the cotton-field, from whence it can be distributed. Within the field there are small subsidiary channels connected with that leading to the field. When the water is first turned on, the mouths of the small channels are closed, and the whole supply is allowed to go into the principal channel. The ryot then takes his stand about ten yards from the mouth and bunds the channel at his feet. As the water comes down he throws it forward right and left with a scoop (*sena*) made of very light wood, (of the simul or cotton-tree,) with a piece of string which he holds in the left hand while he holds the handle in his right. When all the cotton within reach of his first position has been thus sprinkled with water, and the ground thoroughly saturated, the ryot opens the bund and lets down water to the next reach of ten yards, and soon until the whole of the land covered by the sub-channel has been watered, when he proceeds to use the other sub-channels in the same manner until the whole field has received water. Cotton is never irrigated in the ordinary manner by flooding the roots, the cultivators declaring that water unless given from above kills the crop. I have invariably noticed that any crop which has by accident been flooded, even slightly, has suffered considerably. If you call a ryot who is engaged in watering cotton in the ordinary method as above described, he will invariably shut off the water at the source of supply before he comes to you. Any excess of water, such as percolation, entirely ruins the crop. To the eye there is but little perceptible difference, in an ordinary year, between an irrigated crop of cotton and one which has had nothing but rain-water, but the ryots say that there is a great difference in yield independently of the appearance of the plants. Two or three days after each watering, when the upper crust of the soil has got caked and *sour*, (if I may so describe its greenish appearance,) the cultivator takes his kodai and digs the whole field, completely turning over the soil and eradicating all weeds. When the plants are about to come into flower they are thinned, not more than three or four being left in the same place. If they are unusually large and leafy, the tops are nipped off, or calves turned in to graze for a few hours to prevent their running too much to wood, and bearing less flower. The plants vary in height from 2 to 5 feet when in full growth. As the cotton becomes ready for picking, the whole family turns out and collects the pods as occasion demands. The picking begins in May and lasts until July; the crop, however, requires no water after the former month. As no difference is made in the treatment of the two varieties of cotton after they have been picked, one description of their subsequent treatment will do for both. The cotton is first dried in the sun; when dry, the seed is removed, and the cotton, after being cleaned, is worked into thread by the women of the family and sold at the *hats* or to itinerant dealers. This description applies only to the lower classes and Mussulmans, who generally have only just enough for home consumption. The Brahmins and better class of ryots grow cotton on advances made by local mahajuns, to whom they deliver it, and who again resell it at the *hats*, or for export in the same form as the specimens forwarded with my letter dated 1st March, 1873. In this form and in that of thread it is *alone* procurable in the markets, and not in large quantities in either. If, as is probable, the cultivation of this crop should be in future largely extended by means of irrigation, and the supply become greater than the local demand, it may be worth while to try an experimental cleaning-mill worked by water power, and let out by contract to a large dealer in cotton, who would send it, when cleaned, to Calcutta. At present anything of the sort would be certain failure, the supply being little, if any, in excess of the amount that can be worked up by the women of the poorer classes.

**COFFEE-CROP IN CEYLON.**—The Ceylon Observer reports that in all the older districts of that island the coffee-crop will be very short this year. In districts where the rule has been 10 to 12 cwt. per acre, the yield this year will not be over 1 to 3 cwt. per acre. But while on the plantations generally the crop will approach a failure, "the native gardens" promise a full yield. "In the Matella districts the native coffee (last year supposed to be dying out from leaf-disease) is in splendid order and bearing heavily. Scarcely a trace of leaf-disease is to be seen this season on places that but a year ago were covered with it."

**GUINEA GRASS, (*sorghum vulgare*.)**—A small quantity of the seed of this grass having been received from Thomas H. Pearne, United

States consul at Kingston, Jamaica, a portion of it was sent by the Department to a planter in Florida for purposes of experiment. Some of the seed was sown on the 20th of May, on common pine land, slightly manured with cotton-seed. Although not coming up as well as expected, it stooled out, sending out from fifteen to sixty stalks to the seed, and by August 1 was over 5 feet high and very thrifty. Three weeks after the first a second sowing was made on lower and wetter ground; but this did not grow quite as well as the first, although sending out more shoots to the seed, one stool having one hundred stalks in the bunch. A few stalks were cut and planted to test rapidity of growth. The center shoots of these stalks grew as much as 2 inches in twenty-four hours, and 14 inches in one week—indicating, in the experimenter's opinion, that it might be cut to advantage once a month. It did not appear to be affected by drought, and our correspondent says that if it is found to ratoon well (sprout or spring up from the root, as in the sugar-cane from the root of the previous year's planting) on the poor pine lands in Florida its introduction will prove of inestimable value, as there is no reliable forage-grass now cultivated or growing wild in the State.

The following is quoted from a communication to the New York Tribune (October 15) on "hay-making at the South," by C. Tennant Lee, of Dallas County, Alabama:

An exceedingly profitable business, which has sprung up in the last two or three years, is hay-making, from what is known hereabouts as the Johnson grass, after the name of the man who brought it here from South Carolina. It produces a heavy hay, nutritious and palatable to all stock, but it has a single drawback—the seed from it is dangerous; the more widely the hay is sold the worse will be the spread of a grass that takes complete possession of the land. Under the (I believe) correct name of Guinea-grass, many will know it to their sorrow. In three years' time a field once started with it is gone for any cultivation.

Something as fine as the Guinea-grass, and at the same time harmless, is what is here called water-grass. It flourishes in the bottoms of the plowed fields where the ground is moist, and on common land grows 5 and 6 feet tall. The stem is sweet as sugar-corn, and the head which tops the seed-stem is often a foot long, and rich with seeds, which stock eat with avidity. In this country it is regarded as the best grass for hay, horses preferring it to crab-grass or timothy. The head, when first forming, is green, and then a bright red, after turning to a brown. Cut in season, three crops can be easily made from it—a ton, and even two tons, to the acre at a cutting. I cannot learn that this hay has ever been marketed; but this year much has been made, and I expect to see a high price realized from it. Certainly, these facts given do not indicate that the South is moving in a wrong direction.

In his report of experiments on the Madras (India) experimental farm, 1873, Mr. Robertson, in charge, speaks very favorably of Guinea-grass. The better he becomes acquainted with it the more he values it. He refers in a deprecating manner to the erroneous ideas prevalent in regard to the grass, ascribing them to superficial observation and limited experience. Among these false notions he mentions these: That Guinea-grass must be irrigated, not only at the time it is planted, but regularly at stated intervals afterward; that it must be taken up and be replanted on new ground at the end of every two years at the furthest; and that the fodder is *not* a suitable food for stock, and can only be used in small quantities for such a purpose. Mr. R. has fine crops which were never irrigated; a field planted four years ago, which is as flourishing now as at any time, while some of the best results have been obtained in fattening stock with this grass. But the grass must not be planted in the hot season, or during dry weather, when the soil is devoid of moisture; cloudy and showery seasons ought always to be chosen. The methods pursued on the Madras farm are thus given:

Plow, scarify, and weed the land thoroughly; harrow, roll, and pulverize to a fine



tilth; then ridge with the plow, making the ridges at distances of about 2 feet. Manure is then spread in the open furrow between the ridges. The plow is then passed along the line of the ridges, splitting them in the center, and throwing the soil over the manure on either side. The chain-harrow or the roller is then passed along over the surface of the ridges to consolidate them, and the plants (obtained by dividing into several parts old tussocks from another field) are planted on the ridge on the first showery day afterward, care being taken that they are planted uniformly at a distance of 2 feet apart in each direction; thus admitting of the plow being used between the lines of plants and across these lines at right angles. The after-cultivation is simple; little weeding is required if the crop was well manured at planting, but it is advisable to pass the plow or cultivator occasionally through and across the crop, as the absorptive powers of the soil can in this way be kept up. This plowing or cultivating should be repeated at any rate once after the removing of each cutting. A dressing of fold-yard manure should be applied between the plants and plowed in at least once a year. Before the end of the second year the plants, from frequent cutting, will have formed large tussocks. These must be reduced by simply chopping with a hoe or spade. We find it best to make two cuts across the tussocks at right angles to each other, thus dividing it into four parts. Of these, three are removed, and form excellent bedding for the cattle-stalls, the fourth remaining to perpetuate the crop. In this way there is no necessity to remove the plants to other ground, but care must be exercised to see that the soil is *properly* manured, as a crop which yields such *large* returns must necessarily make large demands on the soil.

As to its uses the report says:

The fodder can be used for all kinds of stock; at first, it seems to disturb the digestive organs of some animals, but this is only temporary. I have fed cattle and sheep on it *exclusively* for *months*, not only without any ill effects, but with the most satisfactory results. I have found our Guinea-grass field a capital place in which to graze our working cattle during the hot season, and for the ewes with young lambs I could scarcely desire a better pasture. It produces such an abundant flow of milk in the ewes, however, what is common in such cases, disturbing the health of either mother or lamb.

**JUTE IN PAPER-MAKING.**—The use of jute as a paper material will greatly increase the commercial value of this valuable fiber. The Dundee Advertiser, (Scotland,) on its appearance printed on jute paper, after apologizing for its transparency and thinness, says:

A remarkable fact is that it is the product of Mr. Watson's second experiment, and if we can attain to such a result on only a second trial there need be no fear with respect to further experiments. The thinness and transparency will easily be remedied, as there is nothing to prevent paper made from jute being of any degree of thickness and opaqueness. It may be explained that this sample is made almost entirely from old jute-bagging. We propose to have samples made entirely from jute-fiber. To some extent jute bagging and waste have been used by paper-makers for several years, mixed with other materials; and when we mention that nearly 50,000,000 jute bags were exported last year—the demand for home requirements being also very large—it will be seen how large a quantity of manufactured jute there is to work upon, especially as bagging is only one class of the goods made from this material.

**PRODUCTS OF THE PUNJAB.**—The province of India known by this name yields cotton, sugar-cane, tea, rice, tobacco, and other valuable articles of commerce. Rice is cultivated to the largest extent in the Kangra, Ambalah, Siolkote, Hushiarpur, and Gurdespur districts. Wheat and other food-grains and pulses are grown everywhere. The chief poppy-growing districts are Ambalah, Sharpur, and Kangra. Tobacco cultivation is pretty general, though the greatest area is in the districts of Delhi, Firozpur, Amietsur, Gujronwala, Hushiarpur, Gurdespur, and Siolkote. Cotton is grown generally in all districts, but the chief cotton-producing tract is the Delhi and Hissar divisions. The cultivation of indigo is confined almost exclusively to the three districts of Multan, Muzaffargarh, and Derah-Ghazi-Khan. Tea is grown only in Kangra, while the sugar-cane is grown generally.

**EFFECTS OF FREE TRADE ON AGRICULTURE IN INDIA.**—Fifteen years of open competition with the remainder of the world is producing discouragement and industrial loss in India. The decline in native



manufactures in the province of Oudh, where the population is 500 to the square mile, has been serious in its results, causing a transfer of capital and labor from the dying trades to agriculture. The result is thus stated:

We say nothing of the numbers who were supported by military service, probably 200,000, including the King's army and the retainers of the talookdars. The transfer of their labor from unproductive to productive employment must benefit the country. But the suppression of the manufacture of arms and salt and of the timber trade probably threw 200,000 more people upon the land. The two great weaving castes, the Julahs and the Korees, number more than half a million. We believe about half of them have been driven by competition with Manchester to abandon the manufacture of cloth and betake themselves to agriculture. The same result, but to a less extent, has followed in the case of many other professions. Potters, dyers, cloth-stampers, cotton-combers and cleaners, workers in metal and glass, and makers of fancy articles, too many to enumerate, have forsaken their hereditary trades, and are now found as cultivators of the soil. This has been the only alternative open to them. The system of caste prevents the Indian artisan from transferring his scanty capital, or his skilled labor, from one profession to another. But every Hindoo is more or less an agriculturist, and when other trades fail the land suggests itself as the natural resource.

We believe we are within the mark in stating that, of the eleven million inhabitants of Oudh, about one million have, since the annexation, been converted from traders and manufacturers into agriculturists, either as cultivators or farm-laborers, and that nine millions of acres are now cultivated instead of six. These new agriculturists are unskilled in husbandry, and their labor is expended on the less fertile land of the province.

It cannot be doubted that the return they obtain from the land for their labor and capital is far less than that which they obtained from their respective trades. No writer on political economy seems ever to have anticipated the possibility of such a result of free trade as has occurred in Oudh, the transfer of the capital and labor of a million of artisans from a more to a less productive industry. Such a result cannot but be accompanied with a decrease of the total wealth of a country. And the problem is complicated by other considerations. It must be borne in mind that for every acre taken up for the plow, there is one acre the less for the plow-oxen. The diminution of the area available for grazing cattle has of late years attracted the attention of many settlement officers. In many parts of Oudh the pasture-lands are miserably insufficient, and the wretched leanness of the cattle announces the fact to the most careless observer. Of course the result of ill-fed oxen is a diminished supply of manure available for the land, a result which is also effected in another way. For the clearance of the jungles to make way for the advance of the plow deprives the people of wood for fuel; they are therefore compelled more and more to consume the manure of their cattle for fuel, instead of devoting it to its legitimate purpose of fructifying the exhausted soil.

**SOIL-EXHAUSTION THROUGH EXPORTATION.**—Mr. Robinson, of Madras, recently delivered an address at the British Museum on modern agriculture, in which he made the following statements:

There is a time when every exporting country discovers that exhaustion follows an injudicious exporting trade. The great grain-exporting countries of Europe have already learned this; tracts of country which at the beginning of the export trade yielded large crops of wheat, produce now only one-half, in some instances even less. Thus, in the richest soils in the south of Russia, on which the yield was formerly 40 bushels, the yield is now only 18 bushels. In Poland the result is even worse, and in Dantzic the yield has sunk to 14 bushels. The suicidal agriculture followed in the United States of America has produced the same results. Only eighty years ago the average yield of wheat per acre in the State of New York was 24 bushels; now it is only 15 bushels. In Virginia, which only one hundred years ago contained some of the richest tracts of land in the world and produced large crops, the yield is now, on some of the best of the old arable lands of the State, under 8 bushels per acre. The culture of cotton, tobacco, and maize for export, year after year, on the same land, without a particle of manure, accounts for this; and the same explanation accounts for the thousands of acres of abandoned land on the eastern side of America, which the advancing settler exhausted and abandoned in his westward march; land with which the American Government is perplexed how to deal, the cost of restoring the exhausted elements of fertility being so much greater than the possible value of the land when restored. But so it is in every country and in every district from which the produce has been exported, and in which no attempt has been made to restore the gradually exhausting fertility. A time will come when remunerative cultivation will be impossible, and the land must either be abandoned or put through an expensive course of restorative treatment.

**SOIL-EXHAUSTION AND CHEAP LANDS.**—It appears that even in India it is becoming understood that land under cultivation is liable to decrease in fertility where wild or new lands can be had at a very cheap rate. The *Agricultural Gazette of India* says:

It will be a good thing for Ceylon when the last acre of jungle available for coffee has been felled; for not till then is the necessity for a liberal system of manuring likely to be recognized. Cheap land means, generally, in a few years exhausted land. If the original outlay can be returned in four or five years without manuring, it is useless to expect men to lay out a lot of money, which will only delay this wished-for return.

**THE COTTON-CROP IN AUSTIN COUNTY, TEX.**—The secretary of the Agricultural Society of New Ulm, Austin County, Tex., reports to this Department that the past season has proved a very unpropitious one to the cotton-crop in that section. Owing to the cold spring the crop was about a month later than usual; then the cotton-worm came a month earlier than in 1872. As some fields escaped the ravages of the worm the yield is exceedingly variable, being not above one bale of 500 pounds of ginned cotton to 12 acres in some places, and three and four times as much in others. The crop is inferior in quality to that of 1872, requiring some 200 pounds more of rough cotton to make a bale of ginned. Our correspondent represents that the results of experiments in trying to destroy the cotton-worm with Paris green, as reported, are so conflicting that he is unable to arrive at any satisfactory conclusion respecting them.

**COTTON YIELD GREATER THAN ANTICIPATED.**—The secretary of the Farmers' Society, Pendleton, Anderson County, S. C., reports that, in that section, the cotton-crop turns out better than it promised in September. This is owing to the facts that the fall has been unprecedentedly favorable for picking, and that, though the rust and worm appeared in that upland locality more generally than heretofore known, yet in cases where the attack was not too early and where the growth was very luxuriant, the check thus occasioned proved a benefit rather than an injury.

**SUCCESSFUL FARMING.**—Judge F. M. Wood, of Barbour County, Ala., is reported as having cultivated, the past season, one acre of "poor, sandy land," on which the only fertilizer used was 80 bushels of cotton-seed, with the following results: He sowed it, in January, with oats, from which he gathered 4,606 pounds in the sheaf, and, at \$1.50 per hundred-weight, realized \$69.09. In June he planted corn, and among it, at the suitable time, sowed pease. He gathered 14 $\frac{3}{4}$  bushels of corn, worth \$1 per bushel; 8 $\frac{3}{4}$  bushels of pease, worth \$1.50 per bushel; and 486 pounds of fodder, worth \$1 per hundred pounds; the total amounting to \$101.82. These crops having been all harvested, the land is now sowed in rye for winter pasturage.

**EXPERIMENT IN WINTERING STOCK.**—In an address before the National Stock Growers' Convention, recently held at Kansas City, J. C. Febles, editor of the *Colorado Farmer*, says:

One of our farmers, engaged in mixed husbandry, as an experiment last winter, sheltered and fed hay to, when the severity of the weather required it, a lot of three-year-old steers. Another lot of the same age, size, and condition, as near as possible, he permitted to run at large without shelter or extra feed, as is the usual custom. The winter was an unusually mild one. A few weeks ago the farmer sold both lots of steers and realized a profit of over 100 per cent. on the hay fed, over and above that for which the other cattle sold in the market.

Mr. Febles brings forward this experiment to show the advantages of mixed husbandry over a system of exclusive stock-raising in large herds; and in the same connection he urges that it is impracticable to improve



breeds of cattle, to any extent, where the latter system prevails. The farmer who unites other agricultural industries and sources of profit with stock-growing has facilities and advantages for sheltering, feeding, and improving generally his smaller herd, which the exclusive stock-grower must needs lack.

**STATISTICS OF KANE COUNTY, UTAH.**—A correspondent sends us the amounts and current prices of the principal agricultural products of this county in 1872. The amount of wheat was 2,900 bushels; corn, 2,000; barley, 2,500; potatoes, 5,000; butter, 4,000 pounds; cheese, 3,000. The price of wheat, \$1.25 per bushel; corn, \$1.10; barley, \$1.10; potatoes, 50 cents; butter, 25 cents per pound; cheese, 20 cents. Compared with the census returns for 1869 this shows an increase in wheat of 74 per cent.; (no barley was reported in 1869;) in butter of 14 per cent.; in cheese of 22 per cent.; and a decrease in corn of 61 per cent., in potatoes of 20 per cent.

**SUFFERING FROM DROUGHT.**—A correspondent in Washington County, Iowa, reports that in that locality the severe drought of summer is protracted through the autumn. Wells and streams have generally dried up, and stock are suffering for water. Many cattle have to be driven miles to the principal streams, and even in them water is scant. Owing to the great scarcity of water, thousands of wells have been dug during the fall.

**RENEWAL OF WHEAT CULTURE.**—A correspondent in Sebastian County, Ark., reports that the culture of wheat, after having been almost abandoned in that locality, has now taken a new start, and thousands of acres will be sown this autumn for the first time.

**MULTIPLICATION OF DESTRUCTIVE INSECTS.**—A correspondent in Anderson County, S. C., reports that in that region insects have done more injury to crops and other vegetable growths the past season than he has ever before known. Even the forest-trees have been stripped of their foliage to an unprecedented extent.

**CROPS IN JEFFERSON COUNTY, NEBR.**—The secretary of the Jefferson County Farmers' Club reports that the wheat-crop in that county was good, yielding about 20 bushels per acre. The yield of oats was about 40 bushels per acre. Corn was only about half a crop, and poor in quality. Potatoes were all taken by the bugs. Wheat, before the panic, brought 75 to 85 cents per bushel; since that brings 60 cents; corn, 30; oats, 25; and potatoes, \$1.

**PRICES IN UNION COUNTY, IOWA.**—A correspondent in the above named county reports, October 1, that corn was selling on the street at 20 cents per bushel; potatoes were selling at 50 cents, and the price advancing, as the crop was short. Prairie hay was in good demand, at \$4 per ton, and timothy at \$6.50, the supply of both being short, owing to dry weather in the growing season.

**CROPS IN HOLT AND ATCHISON COUNTIES, MO.**—Our meteorological correspondent in Holt County states that in the northern part of Holt and southern part of Atchison, winter-wheat yielded about half a crop, but of first quality; spring-wheat was good, averaging about 20 bushels per acre, of fair quality. His field of 40 acres yielded 775 bushels, which sold in Saint Louis for \$1.15 per bushel. What he paid out for help in harvesting, (not counting his own work,) thrashing, and freight amounted to 35 cents per bushel. Corn in the section, which promised as good a crop as ever grew, was shrunk by drought to about



three-fourths of an average. On his farm, being on the Missouri bottom, the yield was about equal to last year's in bulk, but lighter in weight. His surplus of 2,000 bushels he has sold in the field, jerked but not husked, for 30 cents per bushel, which is "much better than last year's price." He also has in crib 3,000 bushels of last year's crop, which is selling in the ear at 35 cents per bushel. Early Rose potatoes yielded about an average crop; other varieties about one-third.

**WABAUNSEE COUNTY, KANS.**—The rapid increase of cultivation in Kansas is shown by a comparison of the census statistics with the latest returns of the assessor of this county, as well as the change from corn-planting to wheat-growing, in consequence of last year's experience with cheap corn. The probable yield of this year is the result of careful local estimate. Horses have increased since 1870 from 1,983 to 2,534; mules from 97 to 114; swine from 1,466 to 3,670; cattle from 6,570 to 10,229; while sheep have decreased from 862 to 781. The quantity of butter has increased since 1869 from 69,685 pounds to 109,562, and of cheese from 12,054 to 33,245 pounds. The crop comparison is as follows:

	1869.	1872.	1873.
Corn, bushels.....	220,365	526,577	309,218
acres planted.....		21,992	11,893
yield per acre.....		43½	26
Wheat, bushels.....	63,451	29,974	67,693
acres sown.....		1,826	4,835½
yield per acre.....		16½	14
Oats, bushels.....	28,243	77,550	79,530
acres sown.....		2,115	2,651
yield per acre.....		36½	30
Barley, bushels.....	1,874	13,115	8,030
acres sown.....		539	401½
yield per acre.....		24½	14
Rye, bushels.....	640	2,362	4,935
acres sown.....		164	329
yield per acre.....		20½	15
Irish potatoes, bushels.....	35,669	65,790	28,880
acres planted.....		612	722½
yield per acre.....		107½	40

**BRITISH IMPORT OF WOOL.**—The importations of wool into Great Britain during the nine months ending September 30, in 1872 and 1873, as shown by official reports, were as follows:

	Quantities.		Values.	
	1872.	1873.	1872.	1873.
	<i>Pounds.</i>	<i>Pounds.</i>	<i>Cts. per lb.</i>	<i>Cts. per lb.</i>
Europe.....	29,852,064	23,586,368	28.6	28.6
South Africa.....	24,749,204	31,325,800	32.4	34.1
British India.....	16,617,885	15,787,373	22.2	22.7
Australia.....	164,866,694	177,150,277	31.1	31.5
Other countries.....	27,425,838	21,052,187	23.4	33.3
Total.....	263,511,655	268,902,065	29.6	30.5

**NORTHWESTERN TEXAS.**—One of our correspondents having emigrated from Louisiana to a frontier settlement in Hood County, on the Brazos River, Texas, sends us some account of the geographical and agricultural conditions of that section. The face of the country is di-

versified with rugged hills and beautiful valleys. Cliffs often rise abruptly from the banks of the streams to the height of one hundred feet or more. In the valleys the land is very fertile, producing cotton, wheat, corn, oats, barley, rye, &c. In 1872 some of the wheat-lands of the better quality yielded a fraction over 45 bushels per acre. But in Hood County the larger part of the land is not adapted to tillage, though some of the elevated plateaus, which are post-oak lands, produce very good crops. Water is abundant, since, in addition to the Brazos River, small streams abound. Wood for fuel is plenty, though good timber for building is somewhat scarce. Agriculture is generally in an unimproved and, in some respects, a primitive, state. Our correspondent expresses his intention of doing what he can toward awakening a new interest and developing the resources of the county. Among its other attractions, he specifies more than a dozen "very fine white-sulphur springs."

**ESPARTO-GRASS.**—The rapid increase in the demand for this fibrous product, (*Macrochloa tenacissima*,) chiefly as material for paper, is indicated by the following facts: It was first brought to notice in 1862, when a single cargo was sent to England from the province of Oran, in Algiers. The result of this experiment was that the export from this same province rose from 10,000 quintals in 1863 to 370,000 in 1870 amounting in value, in the latter year, to \$1,500,000.

**NEW PAPER-FIBER.**—According to the Agricultural Gazette of India, a common weed, called *Sida retusa*, growing in great abundance in Queensland and New South Wales, has recently been found to afford a very valuable material for paper-making. It is a species of *malvaceæ*, and the best specimens of it grow about Windsor, New South Wales, where it is known as American lucerne. It is alleged to be of such vitality and vigor of growth as to be almost ineradicable, and to grow in such profusion as to be a very troublesome weed; to be very superior to esparto-grass, clean, easily bleached, and having all the best qualities of flax. "Samples of the *Sida retusa* having been submitted to the chief paper manufacturers in England, one and all have agreed in expressing their most favorable opinion of its perfect adaptability to the purpose of paper-making, and all entertain a very high estimate of its market value." Various species of *sida* are represented to be common throughout India. One, *Sida piliifolia*, referred to by Dr. Forbes Boyle, in his work on Indian fibers, is said to be cultivated in China for its fiber, as a substitute for hemp and flax. Dr. Roxburgh describes its fiber as "strong and pliable, very silky in its nature, and the plant of very rapid and luxuriant growth, three crops being obtained in one year."

**HEALTH FROM FLOWERS.**—It is reported that an Italian professor has discovered that perfumes from flowers have a chemical effect on the atmosphere, converting its oxygen into ozone, and thus increasing its health-imparting power. As the result of his researches he states that essences of cherry, laurel, lavender, mint, juniper, melons, fennel, and bergamot are among those which develop the largest quantities of ozone, while anise and thyme develop it in a less degree. Flowers destitute of perfume have no such effect. He very naturally recommends that dwellers in marshy localities and near places infected with animal emanations should surround their homes with a profusion of the most odoriferous flowers—a recommendation which the Creator, through their beauty and fragrance, addresses to the senses of all sensible people.

**NEW SALMON-FISHERY LAW.**—The British Parliament has recently enacted a law explaining, amending, and adding to existing statutes relating to salmon-fishing. Its design is to make the regulations more stringent and effective. The provisions of the "malicious injuries act," so far as they relate to poisoning water with intent to destroy fish, are made to apply to salmon rivers. It provides that "no person shall buy, sell, or have in his possession any salmon or part of any salmon between the 3d of September and the 1st of February following, both inclusive; and any person acting in contravention of this section shall forfeit any salmon so bought, sold, or exposed for sale, or in his possession for sale, and shall incur a penalty not exceeding £2 for every such salmon or part of any salmon." This is not to apply to salmon cured beyond the limits of the United Kingdom, or within the limits between the 1st of February and the 3d of November, nor to any clean, fresh salmon caught within the limits of the act, or beyond the limits, provided the capture was lawful; but the burden of proof that it was lawful, in either case, is to lie on the person "in whose possession for sale such salmon is found." No draught-net is to be shot within 100 yards of another net before the latter is landed; no fishing except with rod and line is to be permitted 100 yards above or below weirs or mill-races; no eel-baskets are to be fixed between the 1st of January and the 24th of June; and no interference with salmon is to be permitted in close seasons. These are the prominent features of the act, which contains sixty-five sections and three schedules.

## MARKET PRICES OF FARM-PRODUCTS.

*The following quotations represent the state of the market, as nearly as practicable, on the 1st day of November, 1873:*

Articles.	Price.	Articles.	Price.
<b>NEW YORK.</b>		<b>NEW YORK—Continued.</b>	
Flour, superfine State...per bbl.	\$5 20 to \$5 75	Cheese, State factory.....do...	\$0 13 to \$0 14
extra State.....do...	6 00 to 7 00	western factory.....do...	— to —
superfine western.....do...	5 20 to 5 75	Cotton, ordinary to good ordi-	
extra to choice western,		nary.....per lb.	13½ to 14½
per barrel.....do...	6 00 to 10 75	low middling to good	
common to fair, extra		middling.....per lb.	14½ to 16½
southern.....per bbl.	6 20 to 6 95	Sugar, soft yellow.....do...	8½ to 9½
good to choice southern,		soft white.....do...	9½ to 9¾
per barrel.....do...	7 00 to 11 00	Tobacco, lugs, all grades, per	
Wheat, No. 1 spring...per bush.	1 40 to 1 44	pound.....do...	6½ to 7½
No. 2 spring.....do...	1 34 to 1 40	common to medium	
winter, red, west'n, poor		leaf.....per lb.	8 to 10
to choice.....per bush.	1 41 to 1 50	Wool, American XXX and pick-	
winter, amber, western,		lock.....per lb.	58 to 62½
per bushel.....do...	1 51 to 1 55	American X and XX, per	
winter, white western,		pound.....do...	49 to 52
per bushel.....do...	1 45 to 1 70	American, combing, per lb.	57 to 63
Rye.....per bush.	88 to 95	California spring clip, per	
Barley.....do...	1 00 to 1 30	pound.....do...	25 to 35
Corn.....do...	60 to 62	California fall clip, per	
Oats.....do...	45 to 49	pound.....do...	20 to 27
Hay, first quality.....per ton.	26 00 to 28 00	Texas.....per lb.	18 to 35
second quality.....do...	22 00 to 25 00		
Pork, mess.....per bbl.	14 90 to 15 00	<b>BOSTON.</b>	
extra prime.....do...	13 90 to —	Flour, western, superfine, per bbl.	5 00 to 5 50
prime mess.....do...	15 50 to 16 00	western extras.....do...	5 75 to 7 50
Lard.....per lb.	7½ to 7¾	western choice.....do...	8 00 to 11 00
Beef, plain mess.....per bbl.	8 50 to 10 00	southern extras.....do...	6 00 to 6 50
extra mess.....do...	10 00 to 12 00	choice Baltimore.....do...	9 00 to 11 00
Butter, western.....per lb.	13 to 31	Wheat.....per bush.	1 50 to 1 85
State dairy.....do...	25 to 35		



## Market prices of farm-products—Continued.

Articles.	Price.	Articles.	Price.
BOSTON—Continued.		PHILADELPHIA—Continued.	
Rye .....per bush.	\$0 95 to \$1 00	Cotton, low middling to good	
Barley .....do.	1 30 to 1 70	middling .....per lb.	\$0 14½ to \$0 17
Oats, western .....do.	49 to 55	Wool, prime X and XX .....do.	50 to —
Corn, southern yellow .....do.	68½ to 69	Ohio X .....do.	50 to —
western yellow .....do.	68½ to 69	Ohio combing, coarse .....do.	57 to —
Hay, eastern and northern, per		prime tub, coarse .....do.	51 to —
ton .....do.	18 00 to 26 00		
Hay, western choice .....per ton.	24 00 to 25 00	BALTIMORE.	
Beef, western mess .....per bbl.	8 00 to 11 50	Flour, superfine .....per bbl.	4 50 to 5 20
western extra .....do.	11 50 to 12 50	extras .....do.	5 50 to 8 50
Pork, prime .....do.	14 50 to 15 00	family and fancy .....do.	7 25 to 10 50
mess .....do.	15 75 to 16 00	Wheat, white, fair to choice, per	
Lard .....per lb.	8½ to 9	bushel .....do.	1 50 to 1 75
Butter, N. Y. and Vt., common to		amber, choice .....per bush.	1 65 to 1 75
choice .....per lb.	20 to 33	red .....do.	1 35 to 1 62
western, fair to extra,		Rye, common to prime .....do.	80 to 90
per pound .....do.	22 to 30	Corn, white southern .....do.	78 to 80
Cheese, N. Y. and Vt. factory,		yellow southern .....do.	65 to 68
choice, per pound .....do.	14 to 14½	Oats, southern .....do.	50 to 53
western factory, choice,		western .....do.	48 to 50
per pound .....do.	13½ to 14	Hay, western and Pa. ....per ton.	20 00 to 25 00
Sugar, fair to good refining, per		New York .....do.	22 00 to 25 00
pound .....do.	7 to 7½	Maryland .....do.	25 00 to 27 00
Cotton, ordinary to good ordi-		Pork, mess .....per bbl.	15 75 to 16 00
nary .....per lb.	13 to 14½	Beef, Baltimore mess .....do.	15 00 to 20 00
low middling to good		extra .....do.	23 00 to 25 00
middling .....per lb.	14½ to 16½	Lard .....per lb.	7½ to 8
Tobacco, lugs .....do.	7½ to 9	Butter, western .....do.	25 to 32
common to medium		eastern .....do.	24 to 30
leaf .....per lb.	9 to 10½	Cheese, eastern cutting .....do.	15 to 15½
Wool, Ohio and Pa. ....do.	45 to 58	western cutting .....do.	15 to —
Michigan .....do.	42 to 48	Cotton, ordinary to good ordi-	
other western .....do.	42 to 48	nary .....per lb.	11½ to 13½
pulled .....do.	20 to 50	low middling to mid-	
combing fleece .....do.	52 to 58	dling .....per lb.	14 to 14½
California .....do.	15 to 35	Sugar, soft white A .....do.	10 to 10½
Texas .....do.	18 to 30	Tobacco, lugs .....per cental.	6 00 to 8 00
		common to medium leaf,	
PHILADELPHIA.		per cental .....do.	8 00 to 11 00
Flour, superfine .....per bbl.	4 25 to 5 25	Wool, fleece-washed .....per lb.	45 to 50
Pa. extra .....do.	5 25 to 5 75	tub-washed .....do.	55 to 60
Pa. family .....do.	7 50 to 8 00	unwashed .....do.	35 to 38
western family .....do.	7 25 to 8 75	pulled .....do.	35 to 40
western, fancy .....do.	9 00 to 10 00		
Wheat, winter red, western, per		CINCINNATI.	
bushel .....do.	1 45 to 1 52	Flour, superfine .....per bbl.	4 75 to 5 00
Pennsylvania red, per bus.	1 50 to 1 56	extra .....do.	6 40 to 6 75
Pennsylvania, Delaware,		family and fancy .....do.	6 75 to 8 25
and western amber, per		Wheat, good to prime red winter,	
bushel .....do.	1 55 to 1 65	per bushel .....do.	1 32 to 1 35
white .....per bush.	1 75 to 1 88	hill, prime to choice, per	
No. 1 spring .....do.	1 38 to —	bushel .....do.	1 40 to 1 50
Rye, western .....do.	85 to 86	white, prime to choice,	
Corn, western yellow .....do.	62 to 63	per bushel .....do.	1 45 to 1 55
Oats, white .....do.	47 to 50	Rye .....do.	74 to 75
Barley, New York 4-rowed .....do.	1 50 to 1 57	Barley .....do.	1 00 to 1 50
western .....do.	1 40 to 1 55	Corn .....do.	40 to 47
Hay, fresh baled .....per ton.	24 00 to 29 00	Oats .....do.	35 to 42
common and fair shipping,		Hay, baled, No. 1 .....per ton.	16 00 to 17 00
per ton .....do.	20 00 to 22 00	lower grades .....do.	12 00 to 15 00
Pork, mess .....per bbl.	16 00 to —	Pork, mess, city packed .....per bbl.	12 75 to 13 00
prime mess .....do.	14 50 to —	Lard .....do.	7 to 7½
prime .....do.	13 00 to —	Beef, plate .....per bbl.	11 00 to 12 00
Beef, western mess .....do.	8 00 to 10 00	Butter, choice .....do.	28 to 31
extra mess .....do.	9 00 to 12 00	prime .....do.	24 to 27
Warthman's city family,		Cheese, prime factory .....do.	13½ to 14
per pound .....do.	15 00 to —	Sugar, N. O., fair to good .....do.	9½ to 10
Butter, choice Middle States,		N. O., prime to choice .....do.	10½ to —
per pound .....do.	34 to 36	Tobacco, lugs .....do.	8 to 12
choice western .....per lb.	25 to 30	leaf .....do.	12 to 25
Cheese, N. Y. factory .....do.	14½ to 15	Cotton, ordinary to good ordi-	
Ohio factory .....do.	14 to 14½	nary .....per lb.	12½ to 13
Sugar, fair to good refining .....do.	7 to 7½	low middling to good	
Cotton, ordinary to good ordi-		middling .....per lb.	13½ to 14½
nary .....per lb.	11½ to 14		

## Market prices of farm-products—Continued.

Articles.	Price.	Articles.	Price.
CINCINNATI—Continued.		SAINT LOUIS—Continued.	
Wool, fleece-washed, common to fine.....per lb.	\$0 40 to \$0 42	Cotton, low middling to mid-dling.....per lb.	\$0 13½ to \$0 14
tub-washed.....do.	40 to 42	Wool, tub-washed.....do.	40 to 47
unwashed, clothing.....do.	25 to 27	fleece-washed.....do.	34 to 40
unwashed, combing.....do.	32 to 33	unwashed combing.....do.	23 to 33
pulled.....do.	30 to 32		
CHICAGO.		NEW ORLEANS.	
Flour, white winter, extras, per barrel.....	12 00 to —	Flour, fine.....per bbl.	5 00 to 5 25
Flour, spring extras.....per bbl.	5 00 to 5 75	extras.....do.	6 25 to 8 50
Wheat, No. 1 spring.....per bush.	1 00 to 1 04	choice.....do.	8 75 to 9 75
No. 2 spring.....do.	93 to 1 02	Corn, white.....per bush.	80 to —
No. 3 spring.....do.	95 to 96	yellow.....do.	89 to —
Corn, No. 2.....do.	36 to 36½	Oats.....do.	51 to 58
Oats, No. 2.....do.	29½ to 29¾	Hay, choice.....per ton.	27 00 to —
Rye, No. 2.....do.	60 to 60½	prime.....do.	24 00 to 25 00
Barley, No. 2.....do.	1 23 to 1 25	Pork, mess.....per bbl.	15 50 to 16 00
Hay, timothy.....per ton.	11 00 to 15 00	Beef, Texas.....do.	10 50 to —
prairie.....do.	8 00 to 10 00	northern and western, per barrel.....	14 00 to 15 00
Beef, mess.....per bbl.	8 00 to 8 25	Fulton market.....per ¼ bbl.	10 50 to —
extra.....do.	9 00 to 9 25	Lard.....per lb.	8½ to 10½
Pork, mess.....do.	12 00 to 12 25	Butter, choice western.....do.	30 to —
prime mess.....do.	10 50 to 10 75	choice Goshen.....do.	40 to —
extra prime.....do.	8 75 to 9 00	Cheese, choice western factory, per pound.....	15 to 15½
Lard.....per lb.	6½ to 7	N. Y. cream.....per lb.	17 to —
Butter, choice yellow.....do.	25 to 30	Sugar, fair to good fair.....do.	8½ to 9½
medium to good.....do.	19 to 24	light yellow clarified.....do.	10½ to 10¾
Cheese, N. Y. factory.....per lb.	13 to 13½	white clarified.....do.	11 to —
Ohio and western factory.....per lb.	12 to 13	Cotton, good ordinary.....do.	14 to 14½
Sugar, N.O., choice.....do.	9½ to 9¾	low middling to good middling.....per lb.	14½ to 17
N.O., common to fair.....do.	7½ to 8½	Wool, clear lake.....per lb.	26 to 27
Wool, tub-washed.....do.	40 to 52	Louisiana, clear.....do.	19 to 21
fleece-washed.....do.	40 to 43		
unwashed.....do.	24 to 32		
pulled.....do.	35 to 38		
SAINT LOUIS.		SAN FRANCISCO.	
Flour, spring club.....per bbl.	6 35 to 6 60	Flour, superfine.....per bbl.	\$5 37½ to 5 50
winter.....do.	3 25 to 8 65	extra.....do.	5 75 to 6 00
Wheat, spring, No. 2.....per bush.	1 00 to 1 12½	family.....do.	6 50 to 6 75
red winter, No. 2.....do.	1 55 to 1 56	Wheat, California.....per cental.	2 15 to 2 35
white.....do.	1 40 to 1 70	Oregon.....do.	2 05 to 2 30
Corn, No. 2.....do.	38 to 40	Barley.....do.	1 35 to 1 65
Oats, No. 2.....do.	32½ to 34	Oats.....do.	1 49 to 1 65
Rye, No. 2.....do.	61 to 64	Corn, white.....do.	1 25 to 1 35
Barley, No. 2.....do.	1 09 to 1 15	yellow.....do.	1 25 to 1 30
Hay, choice.....per ton.	16 50 to 17 00	Hay, State.....per ton.	17 50 to —
Pork, mess.....per bbl.	13 50 to 13 75	Pork, mess.....per bbl.	18 00 to 18 50
Lard.....per lb.	7 to 9¾	prime mess.....do.	16 00 to \$17 00
Beef, family, mess.....per bbl.	14 00 to —	Beef, mess.....do.	10 00 to 11 00
Butter, choice dairy.....do.	30 to 32	Lard.....per lb.	10 to 12
medium.....do.	18 to 23	Butter, overland.....do.	20 to 25
Cheese, N. Y. factory.....do.	14 to 14½	California.....do.	30 to 35
Ohio and northwestern, per pound.....	13½ to 14	Oregon.....do.	15 to 20
Cotton, ordinary to good ordinary.....per lb.	11 to 11½	Cheese.....do.	14 to 16
		Wool, native.....do.	13 to 14
		Californian.....do.	16 to 20
		Oregon.....do.	20 to —

## LIVE-STOCK MARKETS.

Articles.	Price.	Articles.	Price.
NEW YORK.		NEW YORK—Continued.	
Cattle, extra heeves.....per cental.	\$12 00 to \$12 25	Cattle, milch-cows with calves, per head.....	\$40 00 to \$80 00
good to prime.....do.	10 00 to 11 50	calves, milk-fed, per pound	07 to 10
common to fair.....do.	8 00 to 9 50	grass-fed, per head.	5 00 to 7 50
poorest grade.....do.	5 00 to 6 00	Sheep, adult.....per pound.	04½ to 05
average.....do.	9 00 to 10 00	lambs.....do.	05 to 07
Texans.....do.	5 00 to 9 50	Swine.....do.	04½ to 04¾

## Live-stock markets—Continued.

Articles.	Price.	Articles.	Price.
BOSTON.		CHICAGO—Continued.	
Cattle, choice .. per cental.	\$7 00 to \$7 25	Cattle, medium grades, fair fleshed steers, 1,150 to 1,250 pounds, per cental.	\$4 00 to \$4 35
extra .. do.	6 00 to 6 50	butchers' stock, common to fair steers and good to extra cows, 800 to 1,100 pounds, per cental.	3 00 to 4 00
first quality .. do.	5 00 to 5 50	stock cattle, decently fleshed, 700 to 1,050 pounds, per cental.	2 50 to 3 65
second quality .. do.	4 00 to 4 50	Texans, choice corn-fed, per cental.	4 25 to 4 75
third quality .. do.	3 00 to 3 75	Texans, north-wintered, per cental.	2 75 to 3 75
working-oxen .. per pair.	100 00 to 250 00	Texans, through droves, per cental.	1 60 to 2 50
milch-cows with calves, per head .. do.	35 00 to 60 00	Sheep, good to choice, per cental.	3 50 to 4 00
extra .. per head.	70 00 to 100 00	poor to medium, per cental.	2 75 to 3 25
farrow cows .. do.	15 00 to 40 00	Swine, heavy .. do.	3 50 to 3 90
Sheep, in lots .. do.	2 50 to 3 75	light .. do.	3 70 to 4 00
extra .. do.	4 00 to 4 87½	SAINT LOUIS.	
spring lambs .. per pound.	04½ to 06½	Cattle, choice native steers, 1,300 to 1,600 pounds, per cental.	5 00 to 5 50
Swine, fat western .. do.	05 to 05½	prime second-class natives, 1,150 to 1,400 pounds, per cental.	4 50 to 5 00
store hogs, wholesale do.	— to 07	good third-rate natives, 1,050 to 1,300 pounds, per cental.	3 75 to 4 25
PHILADELPHIA.		fair butchers' steers, 1,000 to 1,200 pounds, per cental.	4 00 to 4 50
Cattle, fair and choice beeves, per cental.	5 00 to 7 00	thrifty stock-steers, 900 to 1,300 pounds, per cental.	3 00 to 3 50
common .. per cental.	3 50 to 4 50	good to choice corn-fat Cherokees and Texans, per cental.	2 50 to 4 00
Sheep, fair to good .. do.	4 00 to 6 00	inferior to common Cherokees and Texans, per cental.	1 25 to 2 00
stock .. do.	2 50 to 3 50	Sheep .. per cental.	3 00 to 3 62½
Swine, corn-fed .. do.	5 50 to 6 82½	Swine .. do.	3 50 to 3 75
slop-fed .. do.	5 75 to 6 00	Horses, good working-animals, per head.	100 00 to 125 00
BALTIMORE.		heavy work-horses, per head.	130 00 to 175 00
Cattle, best beeves .. per cental.	4 87 to 6 12	Mules, 14½ to 15 hands high, per head.	85 00 to 100 00
first quality .. do.	4 00 to 4 87	15 to 15½ hands high, per head.	110 00 to 145 00
medium or good fair quality .. per cental.	3 12 to 4 00	15½ to 16½ hands high, per head.	150 00 to 175 00
ordinary thin steers, oxen, or cows .. per cental.	2 50 to 3 12	NEW ORLEANS.	
general average of the market .. per cental.	4 25 to —	Cattle, Texas beeves, choice, per head.	— to 50 00
extreme range of prices, per cental.	2 50 to 6 12	first quality .. per head.	35 00 to 45 00
most of the sales .. do.	4 87 to 4 75	second quality .. do.	20 00 to 38 00
Sheep, fair to good .. do.	4 00 to 4 75	western beeves, net, per cental.	10 00 to 12 50
good to extra .. do.	4 75 to 6 50	milch-cows .. per head.	35 00 to 50 00
stock dull at .. do.	2 00 to 3 25	choice .. do.	80 00 to 100 00
lambs .. per head.	2 00 to 3 50	calves .. do.	7 00 to 10 00
Swine, corn-fed .. per cental.	6 00 to 6 50	Sheep, first quality .. do.	4 00 to 5 00
still-fed .. do.	5 50 to 6 00	second quality .. do.	3 00 to 4 00
CINCINNATI.		Swine, gross weight .. per cental.	6 00 to 7 00
Cattle, common to medium, per cental.	1 50 to 3 00		
Cattle, good to prime, per cental.	4 00 to 4 75		
Calves .. do.	5 50 to 6 00		
Sheep, common to fair .. do.	2 50 to 3 25		
good to prime .. do.	3 50 to 4 00		
lambs .. do.	4 50 to 5 75		
Swine, light hogs .. do.	4 00 to 4 10		
heavy .. do.	3 90 to 4 00		
CHICAGO.			
Cattle, extra beeves, steers, 1,400 pounds and upward, per cental.	5 60 to 5 80		
choice beeves, fine, fat, well-formed, 3 to 5 years old, 1,300 to 1,450 pounds, per cental.	5 25 to 5 50		
good beeves, well-fattened, finely-formed steers, 1,200 to 1,350 pounds, per cental.	4 50 to 5 00		



## FOREIGN MARKETS.

**WHEAT.**—The dependence of Europe upon American wheat was seldom more apparent or more distinctly recognized than at the present. British commercial journals awaited with some anxiety the result of our monetary crisis, especially with reference to its influence upon our breadstuffs export. The quality of American wheat of the crop of 1873 already received in England has given special satisfaction. Supplies were arriving in excellent condition to an extent which visibly affected prices in the United Kingdom. Continental Europe, at the close of October, had shown no tendency to a large export. In France there was a continued though slow improvement of prices generally, though a few country markets showed a downward tendency. The French small farmers had generally sold out their stocks. Arrivals at Odessa and Taganrog were so moderate that exporters found the rates too high for profitable shipment to British markets. The harvests of Russia were so very unequal and the surplus crop of some provinces were required to meet the deficiencies of others to an extent which renders reliance upon that country, to say the least, very problematical. Germany manifested no anxiety for British orders. The local decline previously noted at a few points had ceased. The Mark Lane Express of October 27, in speculating upon the probabilities of a scarce winter, suggested that this country might meet an extra demand by an extra consumption of maize, a cereal which very poorly bears transportation. Australia was ready with a large shipment, and considerable supplies were hoped for from the west coast of South America, yet the general outlook was toward short supplies and high prices.

The last week of October opened upon small supplies of English wheat in Mark Lane markets, with heavy arrivals of foreign, more than half of which were from New York. Well-dried English samples sold at an advance of 1s. upon the previous rates; others were neglected. American red was rather against buyers. The London weekly averages for October were as follows: 63s. 5d. on 3,751 quarters; 63s. 7d. on 4,088 quarters; 63s. 9d. on 2,059 quarters; 62s. 0d. on 3,152 quarters. The imports of foreign wheat during those four weeks amounted to 3,723,116 quarters. Essex and Kent white wheat was quoted in Mark Lane at the close of October at 52s. to 66s. per quarter; ditto red, 54s. to 62s.; Norfolk, Lincolnshire, and Yorkshire, 53s. to 58s. Foreign wheats—Dantzic, mixed, 62s. to 66s.; ditto, extra, 63s. to 71s.; Königsberg, 62s. to 66s.; ditto, extra, 63s. to 71s.; Rostock, 61s. to 66s.; ditto, old, 70s.; Siberian, red, 57s. to 61s.; ditto, white, 62s. to 64s.; Pomeranian, Mecklenburg, and Uckermark, red, 61s. to 63s.; Ghirka, 55s. to 60s.; Russian, hard, 52s. to 56s.; Saxonska, 60s. to 63s.; Danish and Holstein, red, 61s. to 63s.; American, 55s. to 59s.; Chilian, white, 63s.; Californian, 65s.; Australian, 65s. to 66s.

In Liverpool American white wheat per cental was quoted at 12s. 6d. to 12s. 9d.; red winter and southern, 13s. to 13s. 6d.; No. 1 spring, 12s. to 12s. 2d.; spring No. 2, 11s. 6d. to 11s. 9d.; Canadian, white, 13s. to 13s. 4d.; ditto, red, 12s. to 12s. 6d.; California, white, 12s. 8d. to 13s. 2d.; Chilian, white, 12s. 4d. to 12s. 6d.; Australian, white, 13s. 4d. to 13s. 6d.; Spanish, white, 12s. 10d. to 13s. 4d.; Danubian, 7s. to 9s.; Ghirka, 11s. 6d. to 12s. 2d.; Egyptian, Saida, 10s. 4d. to 10s. 8d.; Behera, 10s. 3d. to 10s. 4d.; Buhi, 12s. 3d. to 12s. 6d.

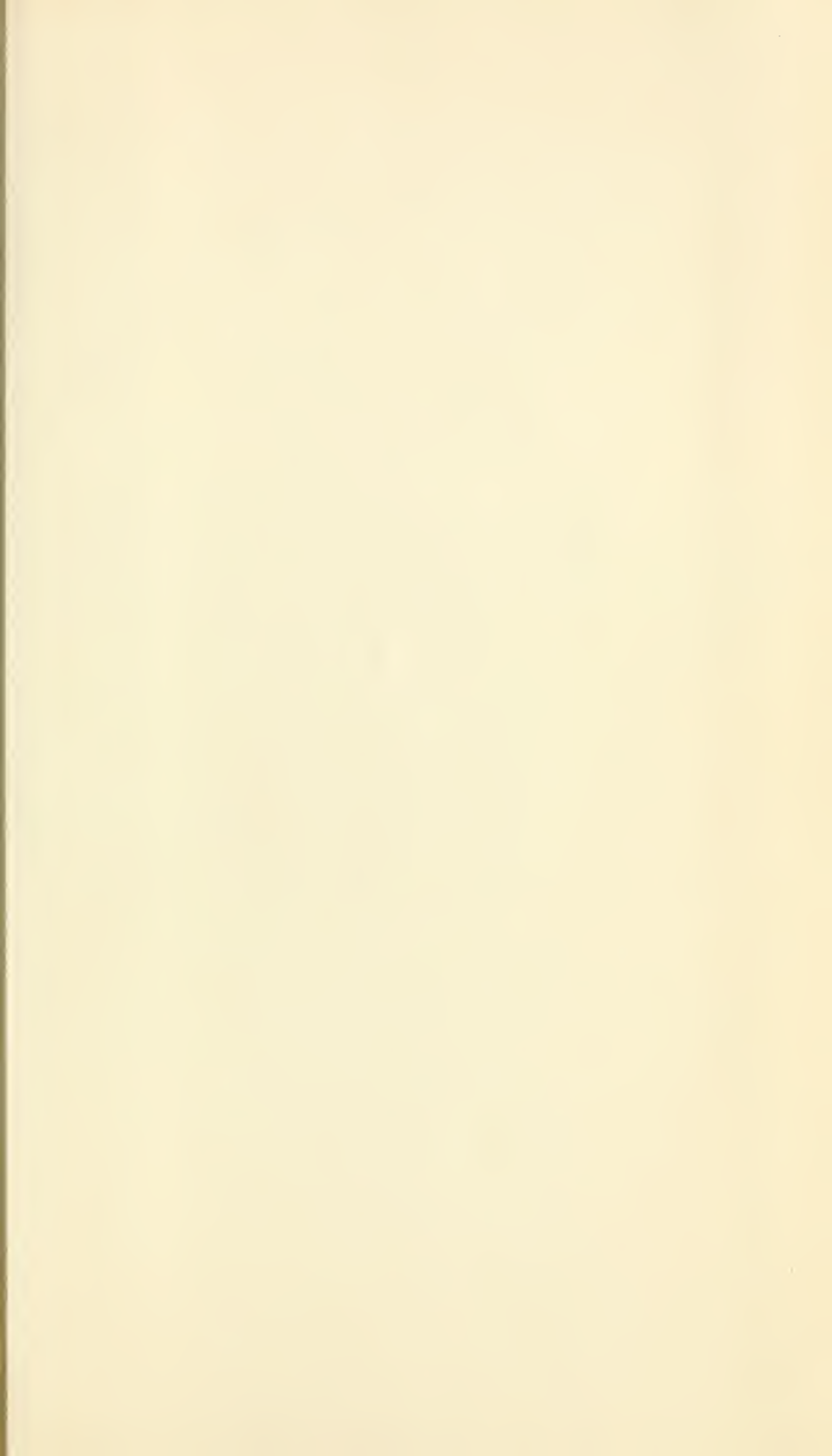
The Paris wheat trade was very firm, with a rise of 1s. to 1s. 6d. per quarter. Mayence white brought 73s. per quarter; center, 67s. 6d.; Blanquillo, of Valledolid and Arevalo, were quoted at 72s.; Californian, at Havre, at 70s. 9d.; American, winter at 66s.; ditto, spring, 65s.

**FLOUR.**—The last week in October opened upon good supplies of country flour in the London market, with fair arrivals in bond from the United States, which were met by a more active demand. This large importation did not lower the rates, as all fine qualities, both English and foreign, maintained their tone. The Paris flour trade was also firm, with an upward tendency. The range of prices for consumption was 52s. 8d. to 56s. per 280 pounds. In Mark Lane the best town households commanded 50s. to 57s. per 280 pounds; best country households, 45s. to 57s.; Norfolk and Suffolk, 39s. to 44s. American brought 28s. to 30s. per barrel; extras, 30s. to 32s. In Liverpool English and Irish superfines were quoted at 44s. to 45s. 6d. per 280 pounds; extra ditto, 45s. 6d. to 50s.; French superfine, 50s. to 57s.; Spanish, 49s. to 50s.; Trieste and Hungarian, 66s. to 75s. 6d.; Chilian and Californian, 46s. to 52s.; American, per barrel, Western State, 30s. to 32s.; extra ditto, 32s. to 34s. 6d.; Baltimore and Philadelphia, 30s. to 35s.; Canadian, 31s. to 36s.

**MAIZE.**—In London American white maize was quoted at 31s. to 35s. per quarter; ditto, yellow, 31s. to 34s. In Liverpool American white brought 34s. to 34s. 6d. per 480 pounds; ditto, yellow, 33s. to 33s. 6d.; Danubian, 31s. to 32s. 6d.; Galatz, 34s. to 34s. 6d. The amount of maize entered for home consumption in the United Kingdom for the week closing October 31 was 47,324 cwt.

**WOOL.**—The English wool market was quiet but firm, prices being well supported. Southdown hoggets, 1s. 8d. to 1s. 8½d. per pound; half-breed ditto, 1s. 9d. to 1s. 9½d.; Kent fleeces, 1s. 8d. to 1s. 9d.; Southdown ewes and wethers, 1s. 4½d. to 1s. 5d.; Leicester ditto, 1s. 8d. to 1s. 9½d.

**LIVE-STOCK.**—In London live-stock quotations for the last week in October were as follows: *Cattle*, coarse and inferior, per 8 pounds, (to sink the offal,) 4s. 4d. to 4s. 10d.; second quality, 5s. to 5s. 4d.; prime large oxen, 5s. 10d. to 6s.; prime Scots, short-horns, &c., 6s. 2d. to 6s. 4d. *Sheep*, coarse and inferior, 4s. 4d. to 4s. 10d.; second quality, 5s. 4d. to 5s. 10d.; prime coarse-wooled, 6s. 4d. to 6s. 6d.; prime Southdown, 6s. 8d. to 6s. 10d. *Calves*, large and coarse, 4s. 2d. to 4s. 6d.; prime small, 5s. to 5s. 4d. *Hogs*, large, 4s. 6d. to 4s. 10d.; small porkers, 5s. to 5s. 4d. A full supply of animals is noted, but indifferent qualities as well as bad weather had restricted sales.





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